

UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF OHIO  
EASTERN DIVISION  
CLEVELAND, OHIO

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**IN RE:** : Case No. 1:17-md-2804  
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: TUESDAY, MAY 10, 2022  
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TRANSCRIPT OF PHASE II ABATEMENT BENCH TRIAL PROCEEDINGS  
HELD BEFORE THE HONORABLE DAN AARON POLSTER  
SENIOR UNITED STATES DISTRICT JUDGE

Official Court Reporter: Sarah Nageotte, RDR, CRR, CRC  
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Northern District of Ohio  
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1 TUESDAY, MAY 10, 2022

2 - - -

3 (Proceedings commenced at 8:33 a.m.)

4 - - -

08:33:26 5 THE COURT: All right. Good morning.

6 COUNSEL EN MASSE: Good morning.

7 THE COURT: This is the Track Three abatement  
8 phase.

9 We've got the attorneys for Lake and Trumbull County  
08:33:45 10 and for the three defendants, CVS, Walgreens, and Walmart.

11 I think we -- I've allowed 25 hours for the  
12 plaintiffs, 25 hours total for the defendants. We'll have  
13 very brief openings, if the parties wish.

14 I don't insist on them, but that's okay. We won't  
08:34:11 15 have closing arguments at the end, we'll just have  
16 posthearing briefs.

17 I have reviewed, as I told everyone, all of the expert  
18 reports, so we can have shortened direct examination, just  
19 sufficient for each side to make the record they wish and  
08:34:33 20 then focus on cross and redirect.

21 I've been tasked with doing something no other federal  
22 judge in our country has ever been required to do, to  
23 establish an abatement plan to remedy the public nuisance  
24 the jury determined last fall that these three defendants,  
08:34:53 25 CVS, Walgreens, and Walmart, were a substantial cause of

1 creating, that being the addiction and dependence of a large  
2 number of people in Lake and Trumbull Counties resulting  
3 from the overdispensing and diversion of prescription  
4 opioids.

08:35:10 5 After listening carefully to the testimony and the  
6 exhibits the parties present over the next two weeks and  
7 then the briefs and arguments of counsel, I will need to  
8 determine, first, the contours of the abatement plan, both  
9 economic and injunctive, the duration of the plan, the cost  
08:35:28 10 of the plan, the portion of the plan that should be fairly  
11 assessed against the defendants, and then the administration  
12 of the plan.

13 So I'm, therefore, requesting that counsel focus their  
14 presentations on these issues and to be as helpful as  
08:35:44 15 possible to me in answering these very complex and  
16 challenging questions.

17 Thank you.

18 So you may now proceed, I guess, if the plaintiffs  
19 wish to make a brief opening, Mr. Lanier.

08:36:00 20 OPENING STATEMENT BY PLAINTIFFS

21 MR. LANIER: Thank you, Your Honor.

22 May it please the Court.

23 On behalf of all of the parties, I suspect, I want to  
24 say thank you for taking the time and for working so  
08:36:29 25 diligently, you and your court staff, to enable us to do

**Opening by Plaintiffs (Lanier)**

7

1 this hearing in an expedited fashion and with such clear  
2 guidance from you.

3 In that regard, Your Honor, I expect to take no more  
4 than ten minutes in this opening statement.

08:36:46 5 We, as plaintiffs, are very mindful of your insight,  
6 Your Honor. You have lived with this case for a long time.  
7 You have given it full attention. You have not just read  
8 expert reports, we recognize that, but you have sat through  
9 a long, full trial. You have dealt with matters in chambers  
08:37:11 10 and out of chambers. I dare say you know this case better  
11 than all of the lawyers in this room and better than the  
12 witnesses.

13 And so, we do pay attention to your insight of ways  
14 that we can help you, and we will try to tailor the trial,  
08:37:27 15 or this phase of the trial, specifically to that and try and  
16 achieve it.

17 Your Honor, some things I can't get away from, and one  
18 of them from me is a roadmap.

19 And so, if I could, Mr. Pitts, have the Wolfe Vision  
08:37:43 20 available, it will allow me to give the Court some guidance  
21 of where I'm going.

22 Thank you.

23 Judge, my brief opening falls into three categories.  
24 I want to briefly speak to the law and the facts, I want to  
08:38:04 25 lay out before you what our ask is, and then I'll give you

1 the roadmap of how we plan on trying the case.

2 The law and the facts, Your Honor, we have filed

3 briefs with you. I won't rehash those. I will emphasize

4 that there is a burden of proof, we believe, on the

08:38:21 5 defendants to try and show divisibility. If this is a bowl

6 of spaghetti mess in the county, we don't determine where

7 one noodle starts and where one noodle stops, short of

8 diving into the spaghetti bowl, and even that would not

9 work. It's much too complicated.

08:38:39 10 I liken it to a cake. And it's true, I wrote my

11 opening while I was hungry, so all of my analogies are food

12 analogies. I'm sorry.

13 But you can take flour, you can take salt, you can

14 take sugar, you can take baking soda, eggs, oil, you can mix

08:38:59 15 sugar, you can mix it all together, and you get a cake.

16 Once you've made that cake, it's impossible to parse

17 out the baking powder, it's impossible to parse out the

18 flour, the sugar. You've just got a cake.

19 And we believe that the law and the facts have

08:39:18 20 indicated and will indicate that you cannot parcel out the

21 bad deeds of one party from another party in this case.

22 They are too intermingled in what they have produced.

23 And so, we're trying to walk a line between the

24 instruction you've given us and our obligation you've given

08:39:40 25 us to a larger MDL, to make sure that the arguments that we



1 make here are consistent with the arguments and positions  
2 that we believe to be the truth in the broader context as  
3 well.

4 So trying to do that moves me to what our ask of you  
08:39:59 5 will be in this case. We will be asking you to appoint a  
6 monitor. We will be asking you to issue an injunction. We  
7 believe the injunction will be close to the injunction  
8 that's been agreed to by CVS in Florida, but it will extend  
9 beyond that, both in the sense that it must cover all of the  
08:40:24 10 parties and that there needs to be a communication between  
11 the parties so that if CVS rejects a prescription from a  
12 doctor and finds it invalid, that information needs to be  
13 available to Walgreens, it needs to be available to Walmart.  
14 And so, we'll be asking for an injunction.

08:40:44 15 We will be asking also that the Court appoint a  
16 monitor. We believe that a monitor is essential, not only  
17 in administering the funds at issue, which we believe should  
18 go into the registry of the Court, but in the process of  
19 trying to determine on probably an annual basis how those  
08:41:06 20 funds are being used and whether or not there's a need to  
21 adjust those funds.

22 For example, Your Honor, we will give you the full  
23 cake. We will give you all of the elements necessary for a  
24 full abatement program, but we recognize that you, Your  
08:41:28 25 Honor, sitting in equity, might determine that some of those

1 remedies are best done on a national basis and some of those  
2 remedies may be best done out of other settlement funds.  
3 And some of those remedies, for example, doctors' education  
4 or surveillance, those remedies may need to most efficiently  
08:41:54 5 proceed with something outside of monies given to these  
6 counties.

7 And so, we'll try to delineate that as best as we can,  
8 even as we set the totality of the money before you.

9 If we have a monitor in place, Your Honor, we believe  
08:42:10 10 that the monitor will be able to review not only those  
11 situations, but if there are situations where, let's say,  
12 one of these defendants enters into a global settlement, and  
13 in that global settlement at some time in the future there's  
14 money set aside for these counties, but there's also money  
08:42:31 15 set aside for other programs, there are other defendants  
16 that continue to settle where money can funnel into these  
17 counties to deal with some of these problems, a monitor  
18 would be able to look at that on a regular basis and assess  
19 whether or not there needs to be an adjustment in the amount  
08:42:51 20 that's flowing to the counties for their use under the  
21 programs that you deem appropriate.

22 So in our ask, we will be setting the entire ball of  
23 wax in front of you, but we will do it in a way that will  
24 allow for you to recognize some programs may be dealt with  
08:43:10 25 better on a national basis and some programs may come out of

1 funding from Big Three settlements, for example, or others  
2 as they make their way to not simply these counties but make  
3 their way to the state of Ohio and what Ohio is doing as  
4 well.

08:43:27 5 And then that leads me, Your Honor, to the third stop  
6 in this brief opening, and that's my trial roadmap. And so,  
7 I'll give you what I've prepared here in the remedy phase of  
8 this trial. And it looks to me like we will try to sculpt  
9 our presentation around the seven areas that you told us  
08:43:48 10 about at the hearing.

11 So we will talk about the scope of the abatement. And  
12 we will use for those witnesses mainly Dr. Keyes, who will  
13 be our first witness, and Dr. Young, who will be our second  
14 witness.

08:44:01 15 Then we will talk about the estimate of costs and --  
16 oh, excuse me, scope of abatement will, of course, also  
17 include Dr. Alexander. Now, Dr. Keyes and Dr. Alexander  
18 both testified in phase I, so they -- but Dr. Young will be  
19 new to phase II.

08:44:20 20 The estimate of costs, that's going to come from  
21 Dr. Alexander and Dr. Burke, an economist who will be new to  
22 this trial phase. And then the years needed, that will also  
23 be something that by and large comes from Dr. Alexander, but  
24 there will be others who touch on that as well.

08:44:40 25 The possible apportionment among the three and the

1 possible apportionment among other parties not in this case,  
2 that will be dealt with by mainly Dr. Keyes who will be  
3 talking about the synergy there, but a lot of that will  
4 also, frankly, be cross-examination of the experts of the  
08:45:00 5 other side.

6 The award going to the county or monitor, we are  
7 asking you to put the award in the registry of the Court and  
8 allow a monitor to oversee its administration.

9 The injunctive relief we will detail to you in  
08:45:20 10 briefing. We think that's the best place for that, though  
11 the witnesses' testimony will certainly be relevant in all  
12 aspects.

13 So, Your Honor, we will first put on Dr. Keyes. She  
14 is ready today. We don't know how long this is going to  
08:45:32 15 take with her, so she is, in fair warning, our only witness  
16 available today.

17 We expect we can finish with her and then, tomorrow,  
18 we will have Dr. Young and Dr. Alexander. And we hope to be  
19 able to do both of them in a day. They could hang over to  
08:45:49 20 Thursday.

21 But Thursday, we hope to finish with not only  
22 Dr. Alexander but Dr. Burke and begin Ms. Fraser and perhaps  
23 even Ms. Caraway.

24 We don't think, as the county representatives, they  
08:46:04 25 have a boatload to say. As the Court has recognized they

1 are fact witnesses, they have already testified to certain  
2 facts, but we do want to make sure that we get some things  
3 on the record.

4 And so, with that, Your Honor, I'm basically done. I  
08:46:19 5 will tell you as one last piece of housekeeping that it is  
6 still our belief and intention that expert reports by and  
7 large as relevant come into evidence, recognizing that you,  
8 the Judge, can make a proper assessment of any inadmissible  
9 hearsay in them, and you do that properly in your findings  
08:46:39 10 of fact and conclusions of law based upon what you choose to  
11 rely on and what you don't.

12 So while we will offer those into evidence and  
13 understand they may not be going into evidence or they may  
14 come into evidence, over objection, we will still, in  
08:46:56 15 addition, put on the record the necessary things during  
16 direct to make sure that we have a sustainable record on  
17 appeal for this remedy phase of this trial.

18 Thank you, Your Honor. And it is a pleasure to be in  
19 front of you again.

08:47:09 20 THE COURT: All right. Thank you, Mr. Lanier.

21 So if I understood it correctly, you may -- you think  
22 you're going to end up your case probably sometime on  
23 Friday, if I was following your roadmap?

24 MR. LANIER: Yes, Your Honor. That would be  
08:47:24 25 our best bet. It's potential we could end earlier. We

1 could end Thursday.

2 THE COURT: Fine.

3 MR. LANIER: But we're going to move  
4 lickety-split.

08:47:34 5 THE COURT: Well, I appreciate that. And so,  
6 the defendants should be ready to have, I guess, at least  
7 someone available Thursday and certainly witnesses Friday,  
8 so that's helpful.

9 Okay. Thank you, Mr. Lanier.

08:47:49 10 Okay. For the defendants.

11 MS. MILLER: Your Honor, may I have permission  
12 to use the well?

13 THE COURT: Yes, sure.

14 I realized we've got some new counsel, and I really  
08:48:05 15 should have asked them to introduce themselves. I was not  
16 polite. So, I know for Walgreens we have new people.  
17 Because other counsel are occupied.

18 MS. HACKER: Yes, good morning, Your Honor.  
19 My name is Kat Hacker. Sitting to my right at counsel table  
08:48:16 20 is my partner, Jeff Hall.

21 MR. HALL: Good morning, Your Honor.

22 THE COURT: Good morning.

23 MS. HACKER: As I'm sure, Your Honor, may see,  
24 our partner, Mr. Stoffelmayr, is also in the gallery with us  
08:48:25 25 today. We represent Walgreens.

1                   OPENING STATEMENT BY DEFENDANT WALGREENS

2                   MS. HACKER: As the Court has recognized,  
3 there are two main issues in this trial, the scope of the  
4 abatement award and the apportionment of that award.

08:48:37 5                   On the issue of scope, defendants will present  
6 evidence that plaintiffs' plan goes far beyond the nuisance  
7 the jury found here and includes overly inflated costs.

8                   As the Court has described, the various programs and  
9 interventions that plaintiffs seek fall on a spectrum of  
08:49:01 10 those that are more directly connected to the nuisance the  
11 jury found to those that get further and further away from  
12 it and can only be described as indirectly or tangentially  
13 related to this nuisance, like job placement programs and  
14 vocational training.

08:49:22 15                   But I do not want to spend the few minutes I have up  
16 here today to go into detail about those programs and  
17 interventions because Your Honor will hear enough about them  
18 during this trial to be able to place them on that spectrum.  
19 Instead, I will focus on apportionment.

08:49:42 20                   Defendants respectfully disagree with the jury's  
21 verdict, but we accept it for the purposes of the remedies  
22 phase we're all here for.

23                   As the Court knows, the nuisance was defined in the  
24 verdict as the oversupply of legal prescription opioids and  
08:50:05 25 diversion of those opioids into the illicit market outside

1 of appropriate medical channels.

2 So to properly apportion an abatement award to that  
3 nuisance, we have to ask a fundamental question: What is  
4 each defendant's responsibility here?

08:50:25 5 These pharmacy defendants should not be held  
6 responsible for shares of the harm that are not attributable  
7 to their own conduct. That means the Court must take into  
8 account two key things: The share of the opioid-related  
9 harm in Lake and Trumbull County that is not attributable to  
08:50:52 10 legal prescription opioids and the share of the harm in the  
11 counties that is not attributable to these specific  
12 pharmacies.

13 On the first, Your Honor will hear undisputed evidence  
14 that there is a portion of the harm caused by illicit  
08:51:15 15 opioids, like heroin and fentanyl, that is not causally  
16 related to prescription opioids.

17 Even under plaintiffs' gateway theory, there is a  
18 portion of harm that is neither directly nor even indirectly  
19 attributable to legal prescription opioids.

08:51:37 20 Second, even once we have the portion of harm that is  
21 attributable to legal prescription opioids, we have to take  
22 into account the many, many other contributing actors to  
23 this nuisance.

24 Everyone here recognizes what the Court said well two  
08:51:59 25 months ago. From the outset, it has been readily apparent



1 that the opioid crisis was caused by a confluence of  
2 failures by virtually everyone, from federal, state, and  
3 local governments to the litany of named defendants in the  
4 thousands of MDL cases and many, many others in between.

08:52:21 5 So to properly apportion an abatement award to the  
6 nuisance the jury found and to the contribution of these  
7 specific defendants, the Court must take into account those  
8 other actors.

9 That means taking into account the fact that  
08:52:40 10 pharmacies are just one link in the supply chain among  
11 regulators, among manufacturers, and among prescribers, as  
12 well as the fact that there are dozens and dozens of other  
13 pharmacies that dispensed opioids in these counties.

14 Those are the two key things the Court must take into  
08:53:06 15 account to properly apportion an abatement award to the  
16 nuisance the jury found.

17 We will hear testimony in this trial showing that  
18 there is a reasonable and rational way to allocate among the  
19 share of harm attributable to legal prescription opioids and  
08:53:29 20 the share of harm attributable to Walgreens, CVS, and  
21 Walmart under the jury's verdict.

22 We appreciate the Court's time and attention to these  
23 important issues, and on behalf of Walgreens, myself, and  
24 Mr. Hall, we look forward to spending the next two weeks  
08:53:50 25 presenting the evidence Your Honor needs to issue an

1 appropriate abatement award.

2 THE COURT: All right. Thank you, Ms. Hacker.

3 A question I have, which may or may not be addressed  
4 by the witnesses, it might be in posttrial briefs, is is  
08:54:09 5 there any case law on sort of your second point?

6 I mean, this is not an award of damages. Everyone  
7 understands that. Damages are what is awarded by a jury or  
8 a court to compensate a plaintiff for past wrongdoings of a  
9 defendant.

08:54:34 10 All right. This is not. Abatement is prospective.  
11 And I'd like to know if there's any case law that says that  
12 prospective abatement is to be apportioned among the  
13 defendants and many other actors that may have contributed  
14 to it, because the remedy is supposed to abate the nuisance.  
08:55:05 15 All right? That's what's supposed to happen. And you can't  
16 partially abate a nuisance. You either abate it or you  
17 don't.

18 I understand the courts may have to decide -- I'm  
19 going to have to tailor the abatement to the nuisance that  
08:55:19 20 the jury found, absolutely, and I'm going to be listening  
21 carefully to that and I'll do my best to do that, and that  
22 goes to your -- what you just said. And I've read,  
23 certainly, the expert reports of some of your experts that  
24 purport to give a methodology for an allocation between the  
08:55:47 25 harm caused by the diversion of legal prescription opioids

1 and the harm caused by purely illegal opioids, obviously  
2 which none of these defendants were involved in, so I  
3 understand that.

4 But you go beyond that, then you have, all right, I  
08:56:05 5 found the nuisance, we defined adequately the nuisance that  
6 the jury found, I would be interested in any case law that  
7 says that when a court fashions relief, that there should be  
8 some further allocation or apportionment between the  
9 defendants in the trial that the jury found responsible and  
08:56:30 10 numerous other actors the jury wasn't asked to consider  
11 because they weren't on trial.

12 Because the focus should be -- I mean, the relief the  
13 counties want is abating the nuisance, and if I say the  
14 nuisance is X and it requires, I guess, hypothetically, this  
08:56:51 15 amount of money to do these four things, which I find are  
16 four or five things directly needed to abate the nuisance,  
17 why should that number, that amount, be divided among the  
18 defendants and a myriad of other people who might be  
19 responsible? All right?

08:57:15 20 Because I -- there may be a major difference in that  
21 determination if you're talking about past damages for  
22 wrongdoing and prospective abatement.

23 So, okay, anyone else in the defendants who wish to --  
24 yes, Mr. Delinsky.

25 ///

1                   OPENING STATEMENT BY DEFENDANT CVS

2                   MR. DELINSKY: Good morning, Your Honor. And  
3 thank you for having us. It's nice to see you again --

4                   THE COURT: Good morning.

08:57:43 5                   MR. DELINSKY: -- in a different season.

6                   Your Honor, let me begin with where you ended.

7                   I don't have citations off the top of my head, but,  
8 Your Honor, I believe, if my memory serves me correct, and  
9 we'll certainly supply them to you, that there are cases  
08:58:03 10 applying Restatement (Second) Section 433B, which is the  
11 operative section here in the context of equitable claims.  
12 But we will supply you with relevant citations on the  
13 question you just asked.

14                   In that regard, Your Honor, I would like to begin  
08:58:28 15 where Mr. Lanier began by addressing the legal framework as  
16 we see it governing apportionment, and we have a quibble.

17                   I believe Mr. Lanier said that the burden is on  
18 defendants to show divisibility.

19                   We disagree with that. We believe the burden is on  
08:59:00 20 plaintiffs to show indivisibility. And what I'd like to do,  
21 Your Honor, is set out the legal framework as we see it and  
22 then raise some issues pertaining to that legal framework.

23                   As we see it, it's a two-step process. Step number  
24 one is: Have plaintiffs sustained their burden of showing a  
08:59:26 25 single injury, i.e., an indivisible injury?

1 If they haven't, harm isn't apportioned. Excuse me.  
2 Harm is apportioned. Because there's multiple injuries, and  
3 you determine which injuries flow to which defendants.

4 If plaintiffs have sustained their burden of showing  
08:59:51 5 an indivisible injury, then the question becomes, can that  
6 indivisible injury be apportioned?

7 And, Your Honor, we'll supply you in posttrial briefs  
8 with the cases and law talking about the standard for  
9 apportioning an indivisible injury.

09:00:17 10 THE COURT: Well, Mr. Delinsky, are you  
11 contending that the harm itself is not indivisible, the  
12 injury isn't indivisible?

13 MR. DELINSKY: 100 percent, Your Honor, that  
14 is exactly our contention, and let me explain why.

09:00:31 15 THE COURT: I'd like to know how you're going  
16 to prove or how you can -- how you can show that it is  
17 indivisible -- that it is divisible.

18 MR. DELINSKY: Well, Your Honor, I want to  
19 advocate right now to a change in the way you just put that  
09:00:45 20 question to me, because it's the burden on plaintiffs to  
21 show it's indivisible. It's not our burden to show -- to  
22 show divisibility, and that's important, Your Honor, and  
23 it's particularly important in this case.

24 THE COURT: All right, look, we didn't have --

09:00:59 25 MR. DELINSKY: This is why.

1 THE COURT: There was no evidence in the trial  
2 based on individual -- just say there are 5,000 addicted  
3 people in Trumbull and Lake County. There may be more.  
4 Just say there are 5,000. There was absolutely no evidence  
09:01:16 5 in the trial as to who any of the 5,000 were, let alone how  
6 they came to be addicted, over what period of time, over  
7 what -- what prescriptions they got. All right?

8 There was no evidence, and there will be no evidence.

9 MR. DELINSKY: And, Your Honor, that's --

09:01:31 10 THE COURT: In this trial.

11 MR. DELINSKY: That's exactly where I am  
12 going.

13 THE COURT: Well --

14 MR. DELINSKY: Exactly where I'm going.

09:01:36 15 Okay. Number one, as Your Honor said, we're looking  
16 at a body of prospective relief. And let's take Your  
17 Honor's hypothetical.

18 Let's assume on a go-forward basis in, let's take  
19 2023, plaintiffs will treat 1,000 people with opioid use  
09:01:58 20 disorder. And, of course, those treatment costs, those  
21 treatment expenses are the vast majority by large orders of  
22 magnitude of the costs of their abatement plan, Your Honor.

23 We will know -- and when I say "we," it's the cosmic  
24 "we." I don't mean the people in this room.

09:02:17 25 It will be known who those people are, okay? And

1 there is data possessed by these pharmacies and by the State  
2 of Ohio to which the counties have access that will be able  
3 to show us whether any of those persons filled prescriptions  
4 at a CVS, at a Walgreens, at a Walmart.

09:02:44 5 So when we speak about treatment and the large bucket  
6 of expense in plaintiffs' abatement plan, that goes to  
7 treatment. In this regard, it is 100 percent divisible. We  
8 can see who filled prescriptions in what number at what  
9 pharmacies, if at all. It is a known fact.

09:03:09 10 Now, Your Honor, to go where you started, that  
11 plaintiffs elected, as a matter of their jury trial  
12 strategy, to pursue their claims at the 30,000-foot level,  
13 to pursue a theory of aggregate proof, does not convert a  
14 divisible injury into an indivisible injury.

09:03:39 15 That was their trial strategy, to which we objected,  
16 and Your Honor allowed them to proceed over our objection.  
17 But that doesn't change the nature of the injury. That's  
18 just their strategic choice.

09:03:57 19 So our position is their election to proceed through  
20 statistics and numbers and their election not to show that,  
21 you know, the 100 or 200 or 300 people who are suffering  
22 from OUD today obtained their pills wrongfully from a CVS or  
23 Walgreens or Walmart, their choice not to do that doesn't  
24 convert the nature of the injury.

09:04:20 25 Okay, Your Honor?

1           And so, that's our position. We see it as more  
2           complex. We see the burdens of this issue differently,  
3           because we have this --

4                   THE COURT: So I understand your argument.

09:04:34 5                   MR. DELINSKY: Okay.

6                   THE COURT: You're saying that unless the  
7           plaintiffs demonstrate to me that there are discrete  
8           individuals in Lake and Trumbull Counties who became  
9           addicted or dependent after receiving prescriptions for  
09:04:59 10          legally dispensed opioids from CVS, I can't order any -- any  
11          abatement against CVS for drug treatment? Is that your  
12          argument? Because I think that's what I took from what you  
13          just said.

14                   MR. DELINSKY: Your Honor --

09:05:20 15                  THE COURT: Unless the plaintiffs demonstrate  
16          that to me, that CVS has no burden. It's the plaintiffs'  
17          burden first to prove the harm is indivisible. And you  
18          don't think it is because you said it is possible,  
19          theoretically possible, to, you know, take each individual  
09:05:40 20          in Trumbull and Lake County who has become addicted or  
21          dependent to opioids and track -- track how that dependency  
22          came and go back and look and see if that person, for  
23          example, filled any of his or her prescriptions at CVS, when  
24          and where, et cetera. So that it's up to the plaintiff to  
09:06:02 25          demonstrate that, and unless they can do so, I can't order



1 CVS to pay money for drug treatment.

2 Is that what you're saying?

3 MR. DELINSKY: Your Honor, your question  
4 touches on two issues.

09:06:18 5 THE COURT: No. I just want to know, is that  
6 what you're saying?

7 MR. DELINSKY: Your Honor, we have put forth  
8 in our proposed abatement plan, we have stated, to the  
9 extent the Court overrules our objection, because we'd be  
09:06:30 10 remiss in not pointing out that we do not believe treatment  
11 is within the proper and legal scope of abatement, but if  
12 the Court overrules our position on that, the alternative  
13 plan we have put forth in our proposal would be just that,  
14 would be that as a patient comes in and for opioid use  
09:06:59 15 disorder addiction treatment, that person's name would be  
16 run through the data, and, likewise, it would be determined  
17 whether that person has insurance that would be covering the  
18 treatment in any event. That is part of our plan, Your  
19 Honor. By "our plan," I mean the CVS plan.

09:07:14 20 That's distinct, Your Honor, from the legal framework.  
21 We're not saying the plaintiffs have the legal burden at the  
22 outset of proving divisibility. We're saying their burden  
23 is to prove indivisibility if they're going to proceed on an  
24 indivisible harm basis.

09:07:35 25 Now, Your Honor, if plaintiffs were to succeed in

1 proving divisibility, we then go to the indivisibility  
2 analysis, and then the question becomes: Can it be  
3 apportioned?

09:07:52

4 That will be the subject of evidence, it will be the  
5 subject of briefing. We'll supply you with the legal  
6 standard in that context.

09:08:11

7 But there is one principle I would like to remind Your  
8 Honor of, and that's the principle that appears in "comment  
9 e" of the Restatement (Second) Section 433B. And what  
10 "comment e" does is it recognizes that joint and several  
11 liability in contexts such as these only has ever been  
12 applied in the context of a very small number of actors,  
13 such as two or three.

09:08:37

14 It recognizes that if the number of actors is large,  
15 if the number of actors is large, joint and several  
16 liability can be disproportionate and unjust and shouldn't  
17 be applied and hasn't been applied in such a context.

09:08:59

18 And, Your Honor, I'd just like to pick up -- other  
19 than reminding you of that provision, that comment, I just  
20 want to pick up on something Your Honor said about the  
21 evidence that the jury heard.

09:09:22

22 The jury did hear evidence that manufacturers were  
23 responsible. The jury did hear evidence that FDA was  
24 responsible, that DEA was responsible, that doctors were  
25 responsible, that drug cartels were responsible.

1 In fact, the jury more than heard that evidence. The  
2 plaintiffs elicited it and conceded it and made it part of  
3 their case, Your Honor, so this is undisputed, admitted fact  
4 in this case.

09:09:48 5 So, Your Honor, I hope that's helpful to you in at  
6 least outlining how we see some of the nuances of some of  
7 this playing out and some of the authority. There's  
8 obviously going to be a lot more on that.

9 But before I sit down, Your Honor, I'd like to hit on  
09:10:07 10 just one other issue, and that is the subject of injunctive  
11 relief.

12 Your Honor, the imposition of injunctive relief that  
13 could impact the provision of health care to residents of  
14 the counties, decisions by licensed professionals who  
09:10:37 15 already are heavily and granularly regulated by state and  
16 federal authorities, is a very solemn subject, especially,  
17 but not exclusively, in light of the intentionality theory  
18 on which the jury was instructed.

19 We do not believe that there are legal or factual  
09:11:13 20 grounds to impose injunctive relief that in any way would  
21 bind the pharmacies in how they dispense medicine and do  
22 business.

23 But subject to that objection, Your Honor, and I would  
24 just be remiss in pointing out what a solemn topic that is,  
09:11:34 25 potentially interfering with how health care's delivered,

1 and maybe "interfering" is not the word you choose, but  
2 providing guidance in one form or another and requirements  
3 on how health care is delivered, subject to our objection to  
4 that, defendants will propose, Your Honor, in our posttrial  
09:11:57 5 briefing a proposed plan that we believe meets several of  
6 the guidelines that you provided us yourself on one or two  
7 of our phone calls. I think Your Honor talked about a  
8 discrete number of bright red flags, and we'll try to  
9 propose something along those lines.

09:12:22 10 Again, it will be over our objection. We will do that  
11 over our objection, and subject to our objection, to assist  
12 the Court.

13 But, Your Honor, I do want to address the monitor. We  
14 do not have a written proposal for a monitor yet. We  
09:12:39 15 haven't seen one. However, I want to take this opportunity  
16 to let the Court know that the defendants, all three of us,  
17 oppose in the strongest terms possible the imposition of a  
18 monitor in this case.

19 There's no factual basis for it. The legal predicates  
09:13:11 20 are not satisfied. We do not think it would be appropriate  
21 given the regulatory scheme that already binds and oversees  
22 the dispensing of controlled substances.

23 Any request for a monitor, Your Honor, will be met  
24 with a substantial response. And we'll obviously put that  
09:13:37 25 in writing, but I did want to take the opportunity to alert

1 the Court to the fact that our proposal would not include  
2 that, and we have strenuous objection to the consideration  
3 and imposition of a monitor.

4 Your Honor, that's all I have for now for opening.

09:13:55 5 THE COURT: Okay.

6 MR. DELINSKY: When we're done with openings,  
7 I do have a quick motion, oral motion, to make regarding the  
8 presentation of the evidence.

9 THE COURT: All right. I mean, I don't know  
09:14:05 10 if we're going to have testimony about a monitor. I'm --  
11 you know, I -- obviously, I knew -- I could have assumed the  
12 defendants would strenuously object.

13 I'm not eager to impose -- it's not my job at all to  
14 regulate the business of three pharmacies. I'm a federal  
09:14:30 15 judge. I can impose -- I can -- to the extent I order  
16 monetary relief, I can set up a structure to make sure that  
17 the county -- the responsible county officials certify in  
18 advance that they're going to spend the money on specific  
19 things, and that they certify, say, within 90 days at the  
09:14:57 20 end of the calendar year that they've only used the money  
21 for these purposes, and candidly, if they haven't spent it,  
22 they return it. So I can do that without a monitor. I can  
23 read those certifications myself.

24 So, again, I'm -- but I don't know if we're going to  
09:15:11 25 have any testimony about that. My guess is we won't. We'll

1 have that in posttrial briefs.

2 But, again, I'm not looking to impose some -- the last  
3 thing I want is some monitor or me to be sort of regulating  
4 pharmacies. That is not appropriate.

09:15:30 5 Okay. Now we'll hear from Walmart. Mr. Majoras.

6 OPENING STATEMENT BY DEFENDANT WALMART

7 MR. MAJORAS: Thank you, Your Honor. John  
8 Majoras for Walmart. And again, it's a pleasure to be back  
9 here. We appreciate your time and the energy that you have  
09:15:44 10 put into this and will be putting into this.

11 There are a couple things I want to note without  
12 repeating where we've been. The first thing I was going to  
13 talk about was the subject you last addressed, which was the  
14 monitor that Mr. Lanier mentioned.

09:15:57 15 I think the defendants have submitted some papers or  
16 some discussion to you already that we think an appropriate  
17 mechanism to be sure that whatever monies are available for  
18 programs to meet the needs of these communities are being  
19 appropriately placed and used. And I think from that  
09:16:17 20 standpoint, we've used the phrase "administrator" more than  
21 a monitor. It's a -- it's maybe just a matter of semantics,  
22 but as Mr. Delinsky said, we do not believe that a monitor  
23 involved and overseeing aspects of the businesses is  
24 warranted by this case or warranted by the law here.

09:16:36 25 I would even suggest to you, following up on

1 Mr. Delinsky about the injunctive relief, we have had a lot  
2 of discussion about this within the joint defense group, and  
3 we would commit prior to the submission of the briefing,  
4 because I think the briefing will address the administrator  
09:16:52 5 and the injunctive relief, we would commit to working with  
6 the plaintiffs to see if we can come to some agreement, ours  
7 under objection, of course, as to what an appropriate  
8 program might look like so that we can narrow that process  
9 for Your Honor's consideration.

09:17:06 10 THE COURT: I would greatly appreciate that.

11 MR. MAJORAS: One aspect that I'd like to  
12 address this morning before we get started with the  
13 evidence, it goes back to something very early that  
14 Ms. Hacker said, and that is -- also consistent with what  
09:17:23 15 Your Honor disclosed as your framework to how you wanted to  
16 look at this case and the evidence coming in.

17 And it's the contours of the plan and then,  
18 ultimately, the duration and the cost of those plans.

19 There's going to be a great deal of evidence presented  
09:17:37 20 by experts from both sides as to what plans are appropriate,  
21 what plans are directly related to the findings of the jury  
22 in this case, and what plans are directly related to the  
23 misconduct that the plaintiffs alleged in the trial below.

24 We believe that will be very important in helping you  
09:17:55 25 understand the contours of the plan. You, the Court, and

1 the parties have had a number of discussions as we prepared  
2 for this trial, as you've laid out what you expect to  
3 happen, and one of the things that is stark, if you only  
4 read the expert reports, is that the experts seem to be very  
09:18:11 5 wide, have a very wide difference in what they think  
6 ultimately the appropriate remedy could be in this case.

7 And I will tell you that our defense experts that we  
8 put on will be very consistent with that and will offer  
9 their reasoning behind why the numbers that they come up  
09:18:29 10 with in their proposal make sense based on what should be  
11 the guiding principles to the decision here.

12 But one thing I want to emphasize is that the way that  
13 we are going to present our case, and I think frankly, the  
14 way the plaintiffs will present their case, there are going  
09:18:46 15 to be a variety of options and different ways that the Court  
16 can consider what makes the most sense for an abatement  
17 remedy in this case.

18 So, for example, from the defense side, if we take the  
19 overall number of the proposal, primarily relating to  
09:19:01 20 Dr. Alexander, we will demonstrate to the Court that those  
21 numbers are inflated for a variety of reasons. And that  
22 reducing those numbers is the first step taken toward  
23 ultimately deciding what the appropriate remedy should be in  
24 this case and then how it should be allocated.

09:19:17 25 And, likewise, the methods that our experts will



1 indicate that they think are the appropriate methods for  
2 allocation can be considered in a variety of ways. I only  
3 raise that point to make it clear that we are not in front  
4 of the Court saying, Your Honor, our only position is X and  
09:19:35 5 if it's not X, we can't see any other position that the  
6 Court can come to.

7 We believe X is, and what we will present, is the  
8 appropriate remedy given the facts that were proven in the  
9 case below and the specific findings of the jury. I say  
09:19:50 10 "below." In the earlier case.

11 But in doing that, we ask the Court to look at the  
12 reasoning and the basis for the experts' decision and how  
13 they go about looking at the specific programs, the specific  
14 numbers, and the specific calculations that are being used.

09:20:06 15 Because those conversations and those decisions can be  
16 used in reaching what the Court may determine is an  
17 appropriate remedy if it disagrees with the final results  
18 that the experts are going to present to it. And I just  
19 want to point that out as we go through this, that we -- in  
09:20:24 20 presenting our evidence, all of that will be very apparent  
21 in terms of what our experts are doing, what they're looking  
22 at for the costs and contours of the programs.

23 Thank you, Your Honor.

24 THE COURT: Thank you, Mr. Majoras.

09:20:37 25 Okay. Thank you. Those remarks were very helpful to

1 the Court as to where we're going.

2 So the plaintiff may call its first witness.

3 MR. DELINSKY: Your Honor, before we do.

4 THE COURT: Oh, I'm sorry. Mr. Delinsky had a  
09:20:55 5 point.

6 MR. DELINSKY: No, that's okay, Your Honor.

7 Thank you.

8 Your Honor, the defense would like to invoke the rule  
9 against witnesses. There's two applications of this. The  
09:21:05 10 first is one we already dealt with in phase I, in the merits  
11 trial, and I want to make sure we're all on the same page on  
12 that.

13 The rule in phase I was that experts couldn't watch  
14 other experts testifying and that the rule against witnesses  
09:21:20 15 applied to experts. I just want to make sure that we're all  
16 in agreement that that rule continues.

17 THE COURT: All right. Let's start with that.

18 I think that's what we -- I think that is what we had  
19 in phase I. Any problem with that from plaintiffs?

09:21:37 20 MR. LANIER: No, Your Honor. We think that's  
21 appropriate and followed in phase I and we'll follow it  
22 here.

23 THE COURT: Okay. That's taken care of.

24 MR. DELINSKY: Your Honor, here's the second  
09:21:45 25 application of the rule on witnesses that I'd like to

1       invoke, and I do so with great sensitivity because  
2       Ms. Fraser is here. It concerns her. We have the utmost  
3       respect for Ms. Fraser and her colleague in Trumbull County,  
4       Ms. Caraway. It concerns them both.

09:22:02 5           And we did give -- Mr. Gallucci and I spoke last  
6       night. We gave them a heads-up about this motion.

7           We would like to invoke the rule on witnesses as to  
8       Ms. Fraser and Ms. Caraway as well for the following reason,  
9       Your Honor: We've now deposed each of them three times,  
09:22:23 10      including yesterday after our status conference on  
11      Wednesday. We believe the record is fixed as to their  
12      knowledge and testimony about the proposed abatement plans.

13           And their knowledge in certain respects, not in every  
14      respect, is limited. Again, not across the board, but in  
09:22:47 15      some respects. And we do have concerns, reasonable and  
16      well-based concerns, that upon listening to plaintiffs'  
17      experts, Dr. Alexander in particular, Ms. Caraway or  
18      Ms. Fraser could obtain new information that could provide  
19      the bases for new testimony, now analyses, that we haven't  
09:23:09 20      had the basis to question them about and discover.

21           So, for those reasons, Your Honor, we do think it's  
22      fair and appropriate for the Court to impose the rule on  
23      them. Again, we really mean no offense or disrespect. We  
24      would -- you know, we're mindful of the provisions of Rule  
09:23:33 25      615. We believe Your Honor has discretion here to exclude

1       them given the unique circumstances here, particularly with  
2       no jury present.

3               And I would just like to note one other thing, Your  
4       Honor. I -- we believe Ms. Fraser isn't even a county -- I  
09:23:49 5       don't mean "even," I didn't mean that; it sounds pejorative  
6       and being like a lawyer here -- isn't a county employee.  
7       The ADAMHS Board is to the left of the county, of which  
8       Ms. Fraser is the director.

9               So we don't even believe it would be -- there's a  
09:24:05 10       right to be here. But that's really beside the point, Your  
11       Honor. She was here at trial.

12              And so -- but we do ask, just for fairness, so that we  
13       are not faced with new testimony and new information and new  
14       potential observations or analyses, that that rule be  
09:24:26 15       imposed here.

16              Thank you, Your Honor.

17                      MR. LANIER: Your Honor, in reply.

18              Federal Rule 615 is clear. At the parties' request,  
19       the Court must order witnesses excluded so they cannot hear  
09:24:38 20       other witness's testimony or the Court may do so on its own.

21              "But this rule does not authorize excluding: (b) an  
22       officer or employee of a party that is not a natural person,  
23       after being designated as the party's representative by its  
24       attorney."

09:24:58 25              We believe that that applies, as it did during phase I

1 of this trial. It equally applies to this ruling -- to this  
2 hearing, or this phase II of the trial, for both Ms. Caraway  
3 and for Ms. Fraser.

4 We do believe that they are both employees of the  
09:25:17 5 county. And we'd be glad to put that under oath. But, Your  
6 Honor, they've been the designated party representative from  
7 the get-go.

8 This was not a concern that was expressed during the  
9 trial when the basis of Mr. Delinsky's argument would have  
09:25:37 10 been just as valid then as it is now.

11 The Court has pointed out that both of these ladies  
12 are fact witnesses. All they can testify to are facts, what  
13 are the programs they've got in place and how have they  
14 worked. The Court was clear on that.

09:25:55 15 These ladies are not in a position to alter their  
16 testimony should they come across new information from the  
17 experts that will be opining. They've had dialogue with  
18 some of the experts before, but that's not the issue in this  
19 case. And if something comes up and they've learned  
09:26:16 20 something new and Mr. Delinsky has a good-faith showing, he  
21 can take their deposition for what I guess would be the  
22 third or fourth time at this point -- fourth time, because  
23 they seem to depose them repeatedly.

24 But their testimony has never changed yet that I know  
09:26:32 25 of. And I think that this is a tempest in a teapot. And I

1 would ask that they be enabled to continue to sit in under  
2 Rule 615(b) .

3 THE COURT: All right. Well, I'm not going to  
4 exclude Ms. Fraser or Ms. Caraway. They were the respective  
09:26:53 5 county representatives for six weeks during, I'll call phase  
6 I, the jury portion, the liability portion of this trial. I  
7 see absolutely no reason why they can't continue to serve  
8 that function. They're not experts. They're providing only  
9 fact testimony.

09:27:15 10 I think the purpose of the -- I allowed a limited  
11 re-deposition or additional deposition of both of them to  
12 the extent that they were going to be providing any  
13 testimony as to whether their county, their respective  
14 county, is expending money on any of the functions  
09:27:40 15 identified in any of Dr. Alexander's report, and, if so, how  
16 much, because I think that would be relevant.

17 Obviously, if Dr. Alexander is saying the county  
18 should be doing X, Y, and Z and they haven't been doing it  
19 for ten years, I mean, that raises a question. If they're  
09:27:55 20 not doing it and they have the money, why aren't they doing  
21 it.

22 So I -- you know, I don't think they're -- the  
23 defendants are at all prejudiced by Ms. Fraser or  
24 Ms. Caraway sitting in this trial. I don't think they're  
09:28:12 25 going to learn anything new hearing these expert reports.

1 And, quite frankly, if they change their testimony, that's  
2 going to affect their credibility. If any of them come in  
3 this week or next week and change what they've said in --  
4 from deposition one, two, and three, particularly three,  
09:28:31 5 which was just a couple days ago, that's going to impair  
6 their own credibility.

7 So I'll deny that, the motion as to those two  
8 witnesses.

9 MR. DELINSKY: Your Honor --

09:28:42 10 MR. LANIER: Thank you.

11 MR. DELINSKY: Your Honor, I don't want to  
12 move for reconsideration already, but if I could just give a  
13 little more body to the concern we have.

14 Dr. Alexander's abatement plan is comprised of a  
09:29:00 15 redress model is what he calls it for each county. Okay?  
16 He has a report, and then I think it's appendices E are the  
17 Trumbull County redress model and the Lake County redress  
18 model.

19 The redress model sets out how many full-time  
09:29:24 20 equivalents are needed for task X, how many people are  
21 needed for task Y, and so on. It's a lengthy document.

22 Ms. Fraser, by way of example, hasn't reviewed that  
23 document. Okay? So the concern, to make it as practical as  
24 possible, is that she hears testimony --

09:29:48 25 THE COURT: Well, let me ask you this.

1           Is the plaintiff going to elicit testimony from  
2           Ms. Fraser or Ms. Caraway on these -- the details of this  
3           redress model?

4                   MR. LANIER: No, Your Honor.

09:30:02 5                   THE COURT: All right. Well, then, she's not  
6           going to be testifying on it. I mean, you're free to ask  
7           her about it.

8                   MR. DELINSKY: Okay. As long as there's no  
9           testimony, you know, taking, you know, a number out of that  
09:30:12 10          redress model and says, you know, do you have -- you know,  
11          do you believe you need the resources set forth in this  
12          redress model. As long as there's nothing like that,  
13          because we asked those questions --

14                   THE COURT: Okay.

09:30:29 15                  MR. DELINSKY: -- and we weren't able to get  
16          the discovery on it, I think we're okay, Your Honor.

17                   THE COURT: All right. Okay. Fine.

18                  MR. GALLUCCI: Your Honor, one point of  
19          clarification.

09:30:45 20                  In their depositions, they were asked about the  
21          redress model. They did not know what a redress model was.  
22          They had reviewed appendix E, which is in a spreadsheet  
23          format. They were asked about whether or not they believed  
24          the county needs the abatement remedies that are delineated  
09:31:04 25          in that redress model. They were asked about whether or not



1 the county currently has abatement remedies which are  
2 delineated in that redress model. And frankly, they would  
3 continue to offer testimony to this Court should they be  
4 asked about those.

09:31:17 5 THE COURT: Well, I'm assuming they would. I  
6 mean, that's their general testimony. But they're not --  
7 they weren't asked specifically to go through line by line  
8 and say, all right, we have this, we need this, we need 20  
9 people versus 30 people, all right?

09:31:32 10 Now, the defendants can -- you know, if you want to  
11 elicit testimony, I mean, they're going to be on the stand  
12 and I'm not going to limit your cross-examination, but the  
13 plaintiffs are not going to be putting on Ms. Fraser or  
14 Ms. Caraway to substantiate, you know, the specifics in that  
09:31:50 15 appendix or that report. All right?

16 MR. LANIER: That's true, Your Honor. They  
17 will be fact witnesses only.

18 THE COURT: All right. Fine.

19 MR. DELINSKY: Your Honor, we stand by the  
09:31:58 20 request.

21 THE COURT: All right.

22 MR. DELINSKY: We understand Your Honor's  
23 objected it. We agree with Mr. Lanier and we hope that this  
24 could end up being a tempest in a teapot, but we reserve our  
09:32:08 25 right to object on these grounds as the testimony comes in.

1 MR. WEINBERGER: Your Honor, can we just set  
2 some ground rules for this case that -- so this was a ruling  
3 that you made. There was more discussion after the ruling.  
4 We want to make sure that for purposes of the timekeeping,  
09:32:24 5 that that gets assigned to the defendants, particularly when  
6 there's a -- there's continuous repetitive arguments being  
7 made.

8 THE COURT: Well, I haven't started -- we're  
9 going to start counting the time now. Okay? I haven't  
09:32:38 10 started yet. We don't have a witness.

11 So if there's extensive objections, the Court can, you  
12 know, allocate and say, all right, you've taken half an hour  
13 on this, I'm taking off the defendants' time or the  
14 plaintiffs' time, like I did in the trial.

09:32:56 15 MR. WEINBERGER: Thank you, Your Honor.

16 THE COURT: Okay. Let's proceed with a  
17 witness.

18 MR. LANIER: Thank you, Your Honor.

19 Plaintiffs call Dr. Katherine Keyes, Kerry Keyes, to  
09:33:08 20 the stand.

21 THE COURT: Good morning, Doctor. Thank you  
22 for appearing.

23 If you could raise your right hand.

24 (KATHERINE KEYES, sworn)

09:33:36 25 THE COURT: Thank you.

1                    DIRECT EXAMINATION OF KATHERINE KEYES

2            **BY MR. LANIER:**

3            **Q**        Dr. Keyes, again, thank you for coming back and for  
4            offering your expertise. We appreciate it.

09:33:51 5            For clarity on the record, will you please state your  
6            name?

7            **A**        Katherine Keyes.

8            **Q**        And, Dr. Keyes, I call you doctor, but you have  
9            already testified in this case, is that fair?

09:34:02 10          **A**        Yes.

11          **Q**        And you testified to your qualifications as an  
12          epidemiologist?

13          **A**        Yes.

14          **Q**        And we've got a copy of your CV?

09:34:16 15                    MR. LANIER: Which, Your Honor, we would mark  
16          as Plaintiffs' Exhibit 23117.

17          **BY MR. LANIER:**

18          **Q**        Ma'am, did you prepare your CV?

19          **A**        Yes.

09:34:27 20          **Q**        And is it accurate and correct?

21          **A**        Yes.

22          **Q**        Does it properly list your qualifications for the  
23          areas in which you will be testifying?

24          **A**        Yes.

09:34:38 25                    MR. LANIER: Your Honor, we offer Plaintiffs'

1 23117 into evidence.

2 THE COURT: Okay. Maybe I'll just take these  
3 up at the end of the day.

4 MR. LANIER: That will be great, Your Honor.

09:34:53 5 **BY MR. LANIER:**

6 **Q** In that regard, Dr. Keyes, I want to make sure that  
7 the record is clear. What do you do for a living?

8 **A** I'm a professor of epidemiology at Columbia  
9 University.

09:35:08 10 **Q** And what is your expertise when it comes to matters of  
11 opioids and possible remedies for problems that exist in  
12 counties?

13 **A** I've studied causation with respect to substance use  
14 disorders, including opioid use disorders, for 15 years  
09:35:26 15 about.

16 **Q** And have you published in peer-reviewed journals to  
17 that end?

18 **A** Yes.

19 **Q** All right. Dr. Keyes, here then is my house -- my  
09:35:35 20 roadmap for your testimony, if Mr. Pitts would enable me to  
21 use the screen.

22 We've got three stops along this road. First is just  
23 some general housekeeping. Then I'd like to put your  
24 opinions and the bases for those opinions on the record.

09:35:51 25 And then I'd like to talk about specifically synergy and

1 interactions and how easy it might be or might not be to  
2 apportion responsibility.

3 Okay?

4 **A** Sure.

09:36:04 5 **Q** All right. Let's start with housekeeping.

6 Did you look specifically at the two counties at issue  
7 in this case vis-a-vis the opioid epidemic?

8 **A** Yes.

9 **Q** And did you -- would you please provide in thumbnail  
09:36:23 10 what your investigation was.

11 **A** Sure.

12 I looked at data from Lake and Trumbull County,  
13 including opioid overdose, opioid use disorder,  
14 opioid-related hospitalizations, harms to children and  
09:36:42 15 families in Lake and Trumbull County. So I examined data  
16 sources that informed the burden of those outcomes in Lake  
17 and Trumbull County.

18 I also did an analysis more broadly in the scientific  
19 literature of the causes of opioid use disorder and the role  
09:37:01 20 of prescription opioid overdose in creating the harms across  
21 the United States, including in Lake and Trumbull Counties.

22 **Q** Okay. Did you have plenty of opportunity to do any  
23 interviewing or speak to anybody or work through the county  
24 specific issues that you'll be testifying about today?

09:37:22 25 **A** Yes. I spoke with people in Lake and Trumbull County

1 who could corroborate what I was seeing in the data from  
2 their experience in the counties.

3 **Q** And I -- did you produce a report that contained your  
4 opinions in this case?

09:37:39 5 **A** Yes.

6 MR. LANIER: And, Your Honor, we'll deal with  
7 that later, but we will try to tender into evidence  
8 Plaintiffs' Exhibit 23116, which is a copy of her report.

9 **BY MR. LANIER:**

09:37:52 10 **Q** Dr. Keyes, in addition to that, have you had a chance  
11 to review some of the criticisms of your work that have been  
12 done by the defense experts in this case?

13 **A** Yes.

14 **Q** And did you issue a rebuttal report to address those  
09:38:09 15 issues?

16 **A** Yes.

17 **Q** All right.

18 MR. LANIER: And, Your Honor, we'll be  
19 tendering that later as well.

09:38:15 20 THE COURT: Is there a specific number on  
21 that?

22 MR. LANIER: Yes, Your Honor.

23 The number for the rebuttal report is Plaintiffs'  
24 Exhibit 22481.

09:38:26 25 Thank you, Your Honor.

1 BY MR. LANIER:

2 Q All right. So, Dr. Keyes, with housekeeping out of  
3 the way, I want to ask you one last question, and that is  
4 this: Did the opinions that you will be expressing under  
09:38:41 5 our next stop, did you base them upon reasonable probability  
6 of the scientific expertise that is called upon in your  
7 area?

8 A Yes.

9 Q All right. Then let's move to the opinions and your  
09:38:54 10 bases for those opinions.

11 Did you set these opinions out in your expert report?

12 A Yes.

13 Q Now, I told his honor in my opening statement -- and  
14 you were not in here for openings, were you?

09:39:09 15 A No.

16 Q All right. I told him that we would have an  
17 assortment of witnesses on an assortment of issues.

18 The scope of abatement, are you able to help lay  
19 foundation in testimony in regards to that issue?

09:39:26 20 A Yes.

21 Q The estimate of costs, are you able to at least  
22 provide some of the background information necessary for  
23 others to build that estimate of costs?

24 A Yes.

09:39:43 25 Q Specifically, what I mean by that is the number of

1 individuals with opioid use disorder, that over time, the  
2 effect upon children, have you opined on those matters as  
3 well?

4 **A** Yes.

09:40:04 5 **Q** All right. Then focusing on those areas with you,  
6 let's look at your opinions and the bases on those. And I  
7 have three I want to direct the Court to and have on the  
8 record for us today.

9 The first is: The number of people in Lake and  
09:40:19 10 Trumbull Counties with opioid use disorder over time.

11 And this is the need for treatment specifically that  
12 we'll be looking at.

13 Did you issue that in your report?

14 **A** I did.

09:40:31 15 **Q** And I've got what is page 53 of your report.

16 Though page 56 of the Exhibit Number, Your Honor.

17 But in page 53 of the report, you've got a section on  
18 need for treatment in Lake and Trumbull County.

19 Can you please direct us to what you were doing and  
09:40:52 20 what your opinions were on need for treatment in Lake and  
21 Trumbull Counties.

22 **A** Yes. In that section, I estimated the number of  
23 people in Lake and Trumbull County who have opioid use  
24 disorder and, therefore, would qualify for services related  
09:41:09 25 to that condition.



1       **Q**       If we look at this in the first section: Number of  
2 individuals with opioid use disorder.

3               Can you tell the Court how you went about estimating  
4 the number of individuals.

09:41:26

5       **A**       Sure.

09:41:45

6               So it's a -- it's kind of a classic epidemiological  
7 problem, right, when you have a population where there's no  
8 registry or there's no, you know, no -- there's no count of  
9 the number of people in Lake and Trumbull County with opioid  
10 use disorder, so you need to estimate it.

09:42:02

11              This is what we're trained to do in epidemiology, is  
12 estimate the size of populations where you don't necessarily  
13 know for sure. So what I did was use kind of a classic  
14 approach called the multiplier method, which has been used  
15 for decades, if not longer, in epidemiology.

09:42:24

16              And the idea of the multiplier method is, okay, I  
17 don't -- I don't have a registry of the number of people  
18 with OUD, but I know the number of people who have a certain  
19 outcome, and I know the probability of that outcome  
20 occurring in the OUD population. So from there, I can  
21 estimate the number of people with OUD.

09:42:42

22              And the outcome that I used was the number of people  
23 dying of a drug overdose. So I know how many people --  
24 there is a registry for the number of people who die of a  
25 drug overdose in Lake and Trumbull County. So if I know the

1 number of people who died of a drug overdose, and I know the  
2 probability of that event, dying of a drug overdose, among  
3 people with OUD, then I can divide the number of people who  
4 died of a drug overdose by that probability to estimate the  
09:42:58 5 population size.

6 And if -- you know, an easy way to think about it is  
7 if you know that -- if you know that in a certain  
8 population, for every 100 people who are in that population,  
9 one will have an event, and you know in a community that two  
09:43:18 10 people have the event, you know that you need -- there's at  
11 least 200 people with the condition in order to have two  
12 people who have the event. So it's sort of the same idea  
13 with the multiplier method.

14 And then, I included some additional adjustments to  
09:43:33 15 that calculation based on the increased lethality from  
16 opioids in more recent years which I can get into.

17 **Q** All right. Let's break this down and make sure we've  
18 got it clear.

19 First, on using this multiplier method that you  
09:43:50 20 described, is that standard usage for an epidemiologist  
21 who's focusing in narrowly on counties, for example?

22 **A** Yes.

23 **Q** And within the framework of that, do you simply do the  
24 multiplier method or do you adjust it based upon information  
09:44:10 25 relevant to the county?

1       **A**       I adjust it based on information relevant to the  
2       counties.

3       **Q**       And in your report, you noted that you have done your  
4       investigation and that those services that have been  
09:44:24 5       provided have been described to you in meetings with local  
6       city and county officials, including April Caraway and  
7       Lauren Thorp from Trumbull County Mental Health and Recovery  
8       Board, and Kim Fraser who directs the ADAMHS Board in Lake  
9       County.

09:44:46 10           Did that assist you as well in doing the adjustments  
11       necessary to make your used multiplier method as accurate as  
12       possible?

13       **A**       Yes.

14       **Q**       All right. Now, in this regard, you have in your  
09:45:02 15       report that this estimate of OUD numbers is an underestimate  
16       of the total number of individuals who may need medically  
17       supervised resources to manage reduction or cessation of  
18       opioid use.

19           Can you explain why?

09:45:22 20       **A**       My calculation of the number of people with OUD did  
21       not include, for example, people who are on high doses of  
22       opioids that have been prescribed to them and may need  
23       medical attention upon cessation of use.

24       **Q**       Okay. And then what adjustments did you make, please?

09:45:44 25       **A**       To the calculation?

1 Q Yes, ma'am.

2 A Sure.

3 So if we just kind of simply took the number of people  
4 who died of drug overdose and divided it by this probability  
09:45:56 5 that I estimated from the literature, that I gathered from  
6 the literature, you know, we could end there.

7 But the meta-analysis that I used for this probability  
8 was based on kind of the pre-fentanyl era. And we know that  
9 drug overdoses really started rapidly accelerating after the  
09:46:20 10 introduction of synthetic opioids, specifically fentanyl,  
11 into the population.

12 So there's a concern that the probability of death,  
13 given that you have OUD, is going up if the product is being  
14 more lethal. So this is another kind of classic  
09:46:38 15 epidemiological problem that we face in many different  
16 areas.

17 So I made sort of two adjustments to the multiplier  
18 calculation. One was, okay, what's the change in the  
19 probability of death given that you have OUD when fentanyl  
09:46:58 20 is in the drug supply versus when fentanyl is not in the  
21 drug supply? So that's one component of it, change in  
22 lethality.

23 And so, to estimate the change in lethality, I used  
24 data from the CDC across the years right before and right  
09:47:16 25 after fentanyl was introduced into the drug supply in Lake

1 and Trumbull County and recorded that abrupt change in drug  
2 overdose death right before and right after.

3 But then there's a second part of it, because the  
4 prevalence of synthetic opioid use is also changing across  
09:47:41 5 time. And so, you have to take account of that as well,  
6 because I'm sure Your Honor has seen the drug overdose death  
7 rates in Lake and Trumbull County and in the nation, and  
8 they just keep going up and up and up.

9 That's indicative of a change in prevalence. So you  
09:47:59 10 have a change in lethality, and you have a change in  
11 prevalence. And I've described the change in lethality.

12 And so, for the change in prevalence, I weighted the  
13 multiplier estimate for the proportion of overdose deaths in  
14 Lake and Trumbull County for which synthetic opioids were  
09:48:18 15 involved. That's kind of a -- but I can explain more if you  
16 have more questions about it.

17 **Q** All right. And His Honor may interrupt at any point  
18 asking questions, but within the framework of my  
19 responsibilities to put this on the record, I want to take  
09:48:34 20 this moment to focus in on the complaints that have been  
21 lodged against you by the defense experts.

22 You had a chance to review the expert reports filed  
23 against you?

24 **A** I did.

09:48:50 25 **Q** And in that regard, Dr. Kessler offered two critiques

1 of your methodology.

2 First he said that the prevalence or the number of  
3 people in the counties with OUD is better captured by the  
4 National Household Survey on Drug Use and Health.

09:49:25 5 Are you familiar with that survey?

6 **A** Very familiar.

7 **Q** It's got an abbreviation that you use called NSDUH, is  
8 that right?

9 **A** Yes.

09:49:37 10 **Q** All right. Question: Why did you not use the  
11 National Household Survey on Drug Use and Health data that  
12 Dr. Kessler says should be used?

13 **A** It's very well-known in the field that the National  
14 Survey on Drug Use and Health pretty dramatically  
09:50:03 15 underestimates the number of people with opioid use  
16 disorder, the total number of people in the population with  
17 opioid use disorder.

18 The -- it's a household survey, so it excludes some  
19 of -- some of the reasons that it underestimates OUD are  
09:50:18 20 that the target population is not the total population.  
21 It's people living in households. And so, that excludes  
22 people who are incarcerated, people who are unhoused or the  
23 homeless, and many populations that are at high-risk of  
24 having opioid use disorder who might just not respond to  
09:50:36 25 someone knocking on your door with a badge saying, I'm here

1 from the Government and I'm here to survey you.

2 So many publications and the literature by  
3 epidemiologists and people who are addiction experts have  
4 talked a lot about how we can't use the national -- the  
09:50:53 5 National Survey on Drug Use and Health to estimate the size  
6 of the OUD population.

7 **Q** All right. I'm going to interrupt for a moment and  
8 underscore this because I want to make sure we're clear.

9 Are you saying that there are peer-reviewed articles  
09:51:09 10 and references of specialists in the field saying that the  
11 National Household Survey on Drug Use and Health  
12 underestimates the actual prevalence of opioid use disorder?

13 **A** Oh, yes. It's very well-known in the field, and it's  
14 in a lot of peer-reviewed papers.

09:51:29 15 **Q** All right. And the second complaint and critique of  
16 your methodology that I'd like to discuss briefly or you to  
17 discuss is where Dr. Kessler states that your estimate of  
18 opioid use disorder is flawed because your meta-analysis  
19 relied on and includes individuals who were extramedical  
09:51:53 20 opioid users and not necessarily individuals with OUD.

21 Can you explain what you mean by that?

22 **A** The title of the paper, the title of the meta-analysis  
23 said, you know, mortality rates among people who are  
24 extramedical opioid users. And so, I think the defense  
09:52:16 25 expert just read the title and really didn't dig into the

1 literature.

2 **Q** And explain what you did as digging into the  
3 literature and how it formed your opinions and supports your  
4 opinions, please.

09:52:28 5 **A** So the part of the paper that I relied on was one of  
6 the supplemental figures, I think it was figure --  
7 supplemental figure 13 or something in that ballpark.

8 And if you actually pull out the papers that were used  
9 to estimate the probability of drug overdose death given the  
09:52:51 10 populations included in the meta-analysis, they were people  
11 with OUD.

12 **Q** Okay. In that regard, you have in your report that  
13 even an estimate of two to four percent prevalence is likely  
14 an underestimate given that Larney reports on death rates  
09:53:13 15 upon extramedical opioid users.

16 Can you explain that aspect of your report, please.

17 **A** Well, it's the same issue. The meta-analysis doesn't  
18 include people who are medical users of opioids, not  
19 extramedical users of opioids. So if we included people who  
09:53:41 20 were medical users of opioids, the proportion of people with  
21 OUD would increase.

22 **Q** All right. So in conclusion, you give table 2 in your  
23 report on, by your report numbers, page 56.

24 Are you able to see it as I put it up on the  
09:54:01 25 projector?



1       **A**       Yes.

2       **Q**       You produced a table where you estimated the number of  
3 individuals with OUD, specifically in Lake and Trumbull  
4 County, by year; is that correct?

09:54:14 5       **A**       Yes.

6       **Q**       And I think --

7                       MR. WEINBERGER: Mr. Lanier, can I just  
8 interrupt for a second?

9                       Would you identify the Exhibit Number for the report?  
09:54:23 10       I don't think we've done that yet. P-23116.

11                      MR. LANIER: I think I did at the very  
12 beginning.

13                      MR. WEINBERGER: Okay.

14                      MR. LANIER: But if not, Mr. Weinberger is  
09:54:31 15 correct, I need to make sure.

16                      Your Honor, we will be offering later, in whole or in  
17 part, some of Plaintiffs' P-23116, which is the original  
18 report of Dr. Keyes.

19                      Thank you, Peter.

09:54:46 20                      THE COURT: So this is page 56 of that report?

21                      MR. LANIER: Yes, Your Honor.

22                      THE COURT: Okay.

23       **BY MR. LANIER:**

24       **Q**       And, Dr. Keyes, in reference to this, I want to draw  
09:54:55 25 down to the year 2019, which I'll represent to the Court is

1 the data that was used by Dr. Alexander. And we've got  
2 these columns we've got to chart down.

3 This is Lake County, and the number of people, is that  
4 true?

09:55:17 5 **A** Yes.

6 **Q** And so, if I keep following that column down, we see  
7 in Lake County 5,934 estimated individuals with OUD in 2019.

8 Is that your opinion?

9 **A** Yes.

09:55:37 10 **Q** And then, if I go to Trumbull County, and I take the  
11 number that you have estimated for Trumbull County and I  
12 draw that line down, in 2019, did you estimate 7,560  
13 individuals with OUD in Trumbull County?

14 **A** Yes.

09:56:00 15 **Q** All right. Thank you.

16 Now, as we walk through your opinions then, we have  
17 covered the number of people in the counties with OUD over  
18 time, specifically focusing and putting into the record  
19 2019. But I want to talk about, second, the consequences of  
09:56:22 20 opioid use disorder and overdose for children in the  
21 counties.

22 Did you form opinions on that as well?

23 **A** Yes.

24 **Q** And those begin on page 57 of your report?

09:56:37 25 **A** Yes.

1 Q Can you basically explain and put on the record what  
2 your opinions and conclusions were in this regard.

3 A Sure.

4 So what I did to form these estimates was I estimated  
09:56:55 5 the number of children in Lake and Trumbull County. I  
6 estimated the proportion of those children that are exposed  
7 to parental opioid use. That includes both exposure  
8 in utero or exposure to parental drug use during their  
9 childhood.

09:57:15 10 I then looked at the scientific literature, and I  
11 estimated what kinds of conditions children are at increased  
12 risk for when they're exposed to parental opioid use, either  
13 in utero or in childhood. And that can include learning  
14 challenges, behavioral disorders, mental health conditions,  
09:57:41 15 like attention deficit hyperactivity disorder,  
16 post-traumatic stress disorder, depression, and other  
17 conditions.

18 I took from the literature how many more times kids  
19 who are exposed to parental drug use are at increased risk  
09:57:59 20 of those conditions. So, for example, if the literature  
21 says children exposed to parental opioid use have two times  
22 the risk of ADHD or three times the risk of post-traumatic  
23 stress disorder compared to children who aren't exposed, and  
24 I know the number of children in Lake and Trumbull County  
09:58:18 25 who I estimate are exposed, I can, from that, determine how

1 many children in Lake and Trumbull County would be affected  
2 by parental drug use based on the scientific literature.

3 And so, that's what I did in the report. I recorded  
4 each condition that -- for which there's a scientific  
09:58:38 5 evidence base for an increase in risk based on parental drug  
6 use, and then I estimated the number of children who were --  
7 whose conditions were related to their -- to their exposure  
8 to parental drug use.

9 **Q** And in that regard, on page 58 and 59 of your report  
09:58:57 10 you have produced a table number 3.

11 Is that correct?

12 **A** Yes.

13 **Q** And in table number 3, do you give to the Court the  
14 approximate number of children in Lake County and Trumbull  
09:59:08 15 County in need of psychiatric and other services to manage  
16 their symptoms?

17 **A** Yes.

18 **Q** And if we are to marry up these charts to make them a  
19 little more readable -- let's see if this works -- as the  
09:59:36 20 Judge looks at your report, he will see -- whoops, I need to  
21 erase -- he will see any mood disorder, prevalence in the  
22 general population, estimated prevalence among children  
23 exposed to the parental drug use, and then the number of  
24 children in Lake County potentially needing psychiatric or  
10:00:07 25 other services to manage the symptoms, ditto for Trumbull.

1 Are those your columns?

2 **A** That's right.

3 **Q** Now, why do you say two times to three times higher  
4 risk?

10:00:21 5 **A** Those -- that is based on scientific literature that's  
6 cited in the previous page on how many more times an  
7 increase in risk there is to children who are exposed to  
8 parental drug use compared to children who aren't exposed to  
9 parental drug use.

10:00:40 10 **Q** Okay. So based upon that, for any mood disorder, you  
11 give the numbers 1,018 to 1,527 for Lake, is that right?

12 **A** That's right.

13 **Q** And then, for Trumbull, those numbers are 1,254 to  
14 1,881. Is that accurate?

10:01:03 15 **A** That's accurate.

16 **Q** And then, any anxiety disorder, can you read those  
17 numbers slowly into the record for Lake County, please.

18 **A** Sure.

19 So I estimate that children -- in Lake County, that  
10:01:19 20 there are approximately 2,271 to 3,407 children who  
21 potentially need psychiatric or other services to manage  
22 anxiety disorder symptoms due to parental opioid use.

23 **Q** And these are linked -- this isn't just general  
24 pell-mell, we got kids with psychiatric problems. This is  
10:01:41 25 what you have determined through scientific methodology is

1 specifically linked to the opioid exposure and abuse?

2 **A** That's right.

3 **Q** All right.

4 THE COURT: Doctor, I'm obviously not a  
10:01:56 5 doctor, but it -- to me -- I mean, isn't an anxiety disorder  
6 like a subset of a mood disorder or vice versa? I mean, I  
7 guess I don't understand exactly what the difference between  
8 some -- a child who suffers from any mood disorder versus  
9 any anxiety disorder.

10:02:17 10 THE WITNESS: Sure.

11 So the mood disorders that were included in that  
12 category included affective conditions, so things like major  
13 depressive episodes, bipolar disorder, a condition called  
14 dysthymia, which is kind of, I guess, you know, a low level  
10:02:35 15 but very prolonged depressive condition.

16 Whereas anxiety disorders are -- include panic  
17 disorder, post-traumatic stress disorder, generalized  
18 anxiety disorder, which is a set of anxious symptoms. So  
19 they're not -- the core symptoms of mood disorders are  
10:02:59 20 really that sadness, hopelessness, and suicidality, whereas  
21 anxiety disorder symptoms include reactivity, you know,  
22 inability to engage socially, for example, reliving  
23 traumatic experiences, startled -- being startled easily.  
24 So those are the anxiety disorder conditions that are  
10:03:21 25 included in that category.

1 So there are two separate sets of disorders.

2 THE COURT: Okay. Thank you.

3 MR. LANIER: But the judge's question --

4 And Your Honor, I don't mean to interrupt. Am I free  
10:03:33 5 to keep going?

6 THE COURT: Right. And I was going to ask at  
7 the end, are these -- there may be some --

8 MR. LANIER: Overlap.

9 THE COURT: -- children who, sadly, have more  
10:03:41 10 than one of these. So I was going to sort of see if you've  
11 factored that in.

12 THE WITNESS: That's right. Yes.

13 THE COURT: I'm sure you're going to get to  
14 that.

10:03:49 15 MR. LANIER: That was my question, Your Honor.

16 **BY MR. LANIER:**

17 **Q** I need to know, as we look at each of these numbers  
18 that you've got here for these different things, I would  
19 assume that there are some kids who have a mood disorder and  
10:04:01 20 are also ADHD, for example, or have a mood disorder and an  
21 anxiety disorder.

22 Are you tracking with the concerns of His Honor and  
23 myself in that regard?

24 **A** Yes. These categories are not mutually exclusive, so  
10:04:18 25 the columns don't sum to 100 percent. Kids can be in

1 multiple categories and, as you suggest, they often are in  
2 multiple categories.

3 That sort of reenforces the need for services for  
4 those children. Certainly, we know that as the number of  
10:04:37 5 number of diagnoses increases, which, again, is kind of the  
6 rule rather than the exception, the need for intervention  
7 increases as well.

8 **Q** So your table 3 does not, nor are we as lawyers  
9 suggesting that it does, total up all of these numbers and  
10:04:56 10 say, therefore, you have, you know, 5,000 whatever children  
11 or 6,000 children with needs, because you can't give that  
12 total; is that fair?

13 **A** That's fair.

14 **Q** Okay. So we're giving specific numbers that should be  
10:05:14 15 appropriate based upon reasonable degree of scientific  
16 certainty, but how those may or may not overlap, you've got  
17 no basis for saying with scientific certainty. Am I right?  
18 Or can you say?

19 **A** That's not what I did in the report. I mean, I  
10:05:31 20 didn't -- I didn't measure the overlap. There are sort of  
21 comorbidity studies, but this was just really a population  
22 level analysis of the level of kids in each of these  
23 categories that likely is in need of services.

24 **Q** Got it.

10:05:47 25 Well, in that regard, can you give us for any anxiety



1 disorder the number of children in Trumbull County?

2 **A** Yes.

3 In Trumbull County, I estimate that between 2,798 to  
4 4,196 children potentially need psychiatric or other  
10:06:06 5 services due to parental opioid use.

6 **Q** And this is due to their parental opioid use?

7 **A** That's right.

8 **Q** Okay. And then, what number of children in Lake  
9 County potentially need psychiatric or other services  
10:06:23 10 because of any substance use disorder -- oh, no, ADHD. I'm  
11 sorry. Because of ADHD?

12 **A** In Lake County, I estimate that between 619 and 929  
13 children potentially need psychiatric or other services to  
14 manage symptoms due to parental opioid use.

10:06:41 15 **Q** And what are the ADHD numbers that you estimate for  
16 Trumbull County?

17 **A** 763 to 1,144.

18 **Q** And then, any substance use disorder, which, again,  
19 I'd go back to the Judge and say, well, haven't we covered  
10:06:56 20 that with mood disorder or anxiety disorder, or is that a  
21 distinct category?

22 **A** That's a distinct category.

23 **Q** Why?

24 **A** Why?

10:07:05 25 **Q** Yes. Explain the distinction, please.

1       **A**       Sure.

2               Substance use disorders that were included here  
3       include alcohol disorders, other drug disorders, including  
4       opioid use. And, unfortunately, children who are exposed to  
10:07:20 5       parental opioid use are at significantly increased risk for  
6       misusing opioids themselves, especially during their  
7       adolescent years, and so that's what's included here.

8       **Q**       And so, this is the adolescent who is dealing with  
9       parental opioid abuse at home and may get into alcohol or  
10:07:40 10       other drugs, even opioids themselves?

11       **A**       That's right.

12       **Q**       All right. And what were those numbers for Lake  
13       County, please?

14       **A**       811 to 1,218.

10:07:50 15       **Q**       And what were the numbers for Trumbull County, please?

16       **A**       1,000 to 1,500.

17       **Q**       And then, final note, learning disability, explain  
18       what that category is, please.

19       **A**       That category includes different learning challenges  
10:08:09 20       that children may have, delays in reading, delays in spatial  
21       processing, in, you know, kind of developmental milestones  
22       that children are expected to achieve throughout primary  
23       school and secondary school.

24       **Q**       And does that -- is that an inclusive group of ADHD or  
10:08:32 25       a subset or independent?

1       **A**       Again, there would be overlap. Kids with ADHD often  
2       have challenges with learning and vice versa. Kids with  
3       challenges with learning, sometimes it's caused by ADHD.  
4       But I'm estimating the numbers separately based on different  
10:08:52 5       scientific literatures because there are kids who have  
6       learning challenges who don't have ADHD, and there are kids  
7       with ADHD who don't have learning challenges, so those are  
8       estimated as separate categories.

9       **Q**       And what are your estimate for learning disability  
10:09:08 10       children in Lake County?

11       **A**       691 to 1,036.

12       **Q**       And the number in Trumbull County?

13       **A**       851 to 1,276.

14       **Q**       And for all of these numbers that you've given me for  
10:09:20 15       these effects on children within these counties, are these  
16       the number of children that potentially need psychiatric or  
17       other services to manage symptoms due to parental opioid  
18       use?

19       **A**       That's right.

10:09:34 20       **Q**       And all of these opinions, like the rest of your  
21       opinions, are they based upon reasonable degrees of  
22       scientific certainty?

23       **A**       Yes.

24       **Q**       All right. Then the third area of your opinions to  
10:09:46 25       talk about is quantifying the proportion of death

1       attributable to prescription opioids.

2               Have you done that?

3       **A**       I have.

4       **Q**       And can you please tell the Court, first, the

10:10:03 5       methodology you used to derive your opinions, and then we'll

6       put the opinions down with the bases.

7       **A**       Sure.

8               So really kind of a two-part process. The first part

9       is I used deaths for which there was a listed contributing

10:10:25 10       cause that was a prescription opioid on the death

11       certificate. So if a medical examiner had said prescription

12       opioids contributed to this person's death, I considered

13       that to be a death directly attributable to prescription

14       opioids. So that was kind of the first category.

10:10:41 15       The second category is these indirectly attributable

16       deaths. So someone who doesn't have prescription opioids

17       listed on the death certificate as a contributing cause,

18       some of those deaths are indirectly attributable to

19       prescription opioids. If, for example, someone started

10:10:59 20       using opioids with a prescription, then transitioned to

21       heroin use or fentanyl-related products and died with only

22       heroin or fentanyl in their system, that death is still

23       indirectly attributable to prescription opioids if -- based

24       on the proportion of people who probably started their

10:11:20 25       opioid use with prescription opioids.

1           So I used data to estimate the proportion of heroin  
2           users who start with prescription opioids, applied that  
3           proportion to the deaths for which a prescription opioid  
4           wasn't listed as that estimate of the indirect contribution  
10:11:42 5           of prescription opioids to that death.

6           **Q**       And what were the opinions you came up with using this  
7           methodology?

8           **A**       So in figure 14 of the report, I provide an analysis  
9           by year --

10:12:06 10          **Q**       And excuse me, for housekeeping, figure 14 is on page  
11           60 of your report, which we have marked as Plaintiffs'  
12           Exhibit 23116.

13                    So page 60 of your report, figure 14, I've got it on  
14           the monitor, can you please testify to your findings that  
10:12:22 15           are on this report.

16           **A**       Sure.

17                    So the black line here is all overdose deaths in Lake  
18           County on the left and Trumbull County on the right.

19                    And so, from that number of all overdose deaths, the  
10:12:41 20           orange line is deaths directly attributable to prescription  
21           opioids. And, again, that's where prescription opioids were  
22           listed as a contributing cause.

23                    And then, the blue line is deaths indirectly  
24           attributable to prescription opioids. So that's of the  
10:12:58 25           remaining deaths for which a medical examiner did not

1 certify that the death was caused by prescription opioids,  
2 that's the proportion that I estimate are indirectly  
3 attributable to prescription opioids based on the likelihood  
4 that someone started with prescription opioids and then died  
10:13:20 5 of a different opioid.

6 **Q** And so, if we look at this chart, we've got within the  
7 chart on the left-hand axis, going up the chart, deaths from  
8 zero to 30 to 60 to 90.

9 True?

10:13:36 10 **A** Yes.

11 **Q** And then, on the axis across the bottom of the chart,  
12 you've got the years. And so, we can see, for example, the  
13 peak year for the line which is orange was 2011. And it  
14 looks like roughly 30 deaths in that year; is that true?

10:13:58 15 **A** That's right.

16 **Q** And then, the blue line seems to peak in 2016,  
17 somewhere north of 30 deaths that year, fair?

18 **A** Yes.

19 **Q** And that was for Lake County, those questions.

10:14:15 20 Did you do the same for Trumbull County in the chart  
21 next to it?

22 **A** Yes.

23 **Q** Why are there some missing gap lines in the Trumbull  
24 County chart?

10:14:28 25 **A** That is due to the -- the reporting standards for the

1 CDC WONDER data. When there are too few deaths, they  
2 don't -- they don't want you to report any potentially  
3 identifying information. So for those years, you can see  
4 the total number of opioid deaths are the lowest in those  
10:14:47 5 years. We did not report information on the number of  
6 deaths directly attributable to prescription opioids because  
7 it would fall below that reporting standard.

8 **Q** So you have no data for those years?

9 **A** Yeah.

10:15:00 10 **Q** All right. The years you've got data for, you seem to  
11 show two different peaks for prescription opioid orange line  
12 in 2007, 2010 at 30 deaths; is that right?

13 **A** Yep. Yes.

14 **Q** And then, for the blue line, indirect cause, you seem  
10:15:23 15 to peak in 2017 at something in -- north of 45 deaths; is  
16 that correct?

17 **A** That's right.

18 **Q** All right. And again, is this opinion also, and this  
19 work and methodology, based upon a reasonable degree of  
10:15:45 20 scientific certainty?

21 **A** Yes.

22 **Q** All right. Last stop on your road -- and then I'll  
23 pass the witness, Your Honor -- is synergy and interactions.

24 Can you -- and I've taken that language from your  
10:16:02 25 supplemental report, which we have marked as Exhibit

1 Number 22481.

2 Can you explain what you mean when you use that  
3 language, "synergy and interactions"?

4 **A** Sure.

10:16:18 5 This is a concept that we teach in all of our graduate  
6 sources in epidemiology and really formalizes how we  
7 quantify risks in epidemiology, which is through this  
8 concept of synergy and interaction, which is that for a lot  
9 of the -- a lot of the causes that we study in epidemiology,  
10:16:41 10 they interact with other causes to produce harm.

11 And so, the example I give in the report is smoking  
12 and lung cancer. We all can accept that smoking is a cause  
13 of lung cancer. It increases the risk that lung cancer will  
14 occur, especially with dose and duration, but some people  
10:17:02 15 will smoke their whole lives and not get lung cancer and  
16 some people will get lung cancer and never smoke.

17 So smoking has to interact with other things in the  
18 environment to cause lung cancer. So the risk of lung  
19 cancer, if you smoke, is potentiated if you're exposed to  
10:17:20 20 asbestos, you know, if you have other environmental  
21 conditions that affect the respiratory system. And that's  
22 really been quantified and formalized in epidemiology as a  
23 system of mathematical risk assessment.

24 And the same thing really applies in the opioid  
10:17:43 25 epidemic. You know, if we look at the progression of the



1       opioid epidemic, we have synergy and interaction in that  
2       classical epidemiological sense.

3               For example, we have an oversupply of prescription  
4       opioids in Lake and Trumbull County. That created a  
10:17:57 5       population of people who had opioid use disorder. Once you  
6       have a population of people with opioid use disorder, we see  
7       the introduction of heroin and other illicitly manufactured  
8       opioids into Lake and Trumbull County that is responding to  
9       and meeting that underlying vulnerability that's been  
10:18:18 10       created in the community.

11              And so, these different aspects really build off of  
12       each other and interact to create a system of harm to the  
13       community that really started with the prescription opioid  
14       oversupply and then transitioned to these other illicitly  
10:18:35 15       manufactured distribution systems.

16              But they can't be considered in isolation in this  
17       formal epidemiological thinking. They have to be considered  
18       as interacting factors that produce the harms that we see  
19       today.

10:18:48 20       **Q**       So is it not possible -- or is it possible under  
21       epidemiology to say, well, the only responsibility of a  
22       pharmacy for contributing to this epidemic that you have  
23       assessed from an epidemiology perspective, the only  
24       responsibility is for the drug sold by that pharmacy to that  
10:19:15 25       individual? Is that fairly done?

1       **A**       That's not a public health approach. That's not how  
2 we think about how harms are distributed in communities in  
3 public health and epidemiology. We think of them as these  
4 synergistic factors that work together.

10:19:35 5       **Q**       And in that regard, I spoke with you, heavens, a month  
6 ago or so, and I was asking you -- I remember, I had just  
7 had a piece of cake, and I was asking you about my cake  
8 analogy. I used the cake analogy for His Honor this morning  
9 in opening.

10:19:53 10           Do you remember our conversation in that regard?

11       **A**       Yes. I -- I thought the cake analogy was very apt,  
12 and it's actually one that we use in our epidemiology  
13 classes too, so --

14       **Q**       Yeah --

10:20:05 15       **A**       -- you passed.

16       **Q**       So maybe that's where I got it from. I don't know.

17           But explain why it is, in your opinion as an  
18 epidemiologist expert, impossible to take the cake apart and  
19 segregate out responsibilities in that way?

10:20:23 20       **A**       Well, because of the scientific literature. That's  
21 just how we know how harms get distributed in communities.

22           The -- it's not apportionable. Or another way that we  
23 often describe it in epidemiology is that the risks don't  
24 add up to one, right? Like, we can't take a pie chart of  
10:20:45 25 the opioid crisis in Lake and Trumbull County and then have

1 one piece of pie for every component, because the components  
2 are working together. And so, when the components work  
3 together, those risks are going to add up to more than one  
4 because of that interaction.

10:21:04 5 **Q** Okay. In your supplemental report, when you dealt  
6 with this issue, I'd like to highlight some language and  
7 have you explain it, please.

8 You said this concept of community exposure is key to  
9 understanding the effects of oversupply of prescription  
10:21:25 10 opioids on many communities in the U.S., including Lake and  
11 Trumbull Counties.

12 Do you see where I'm reading?

13 **A** I do.

14 **Q** You said: The oversupply of prescription opioids led  
10:21:37 15 to increased rates of opioid use disorder and addiction and  
16 increased the risk of transition to other opioid products  
17 such as heroin.

18 What did you mean by that?

19 **A** As detailed in my report, and I think as I testified  
10:21:54 20 to in the first part of this trial, there's sufficient  
21 epidemiological literature to conclude that prescription  
22 opioid use is a causal risk factor for heroin use.

23 So some people who are using heroin right now in Lake  
24 and Trumbull County, that heroin use was caused by their  
10:22:14 25 exposure to prescription opioid use.

1 Q Once heroin distribution markets were established --  
2 I'm reading again from your report.

3 Once heroin distribution markets were established in  
4 these communities, harms continued to increase, including  
10:22:31 5 increased exposure to heroin, among those who may not have  
6 been directly exposed to prescription opioids.

7 Can you explain why you consider that part of the  
8 synergy that you're having to address here?

9 A Sure.

10:22:46 10 And we see this same kind of progression in other  
11 areas of public health, but the idea is pretty basic. If  
12 you have a whole population of people who have a high degree  
13 of opioid use disorder due to prescription opioids, then  
14 that's going to be a community vulnerable to the  
10:23:04 15 introduction of heroin and other illicit distribution  
16 networks.

17 You have people who started on prescription opioids  
18 who then transitioned to heroin, and then you have other  
19 people, once the heroin dealers are in your neighborhood,  
10:23:15 20 who are going to use heroin, perhaps not having been exposed  
21 to prescription opioids, but those heroin dealers are there  
22 because there was a ready and available population of people  
23 with OUD who would have a high demand for the product.

24 And so, that synergy of the oversupply of prescription  
10:23:39 25 opioids creating a population of people with opioid use

1 disorder, some of whom transitioned to heroin, so now we've  
2 got the introduction of people who are going to profit from  
3 a population of people with OUD, those work together then to  
4 create an even worse problem in Lake and Trumbull County,  
10:23:57 5 including now people who start using heroin who might not be  
6 exposed to prescription opioids first.

7 **Q** Dr. Keyes, I tend to think in pictures.

8 You've got a son, Aidan.

9 How old is Aidan?

10:24:11 10 **A** 11.

11 **Q** I remember he was here when you testified, but he  
12 didn't get to come back today?

13 **A** No. He's -- he has play practice today.

14 **Q** All right. Has Aidan ever taken dominoes and instead  
10:24:25 15 of playing them as a numbers game stacked them up one after  
16 the other?

17 **A** Oh, he loves doing that.

18 **Q** And you makes shapes and whatever?

19 **A** Yes.

10:24:33 20 **Q** And you push over one domino, and then successive  
21 dominoes fall, assuming, à la Paul's graph, assuming they  
22 are close enough to the preceding domino, right?

23 **A** Right.

24 **Q** All right. Are you saying that overprescription and  
10:24:52 25 oversupply of opioids is a domino that in my analogy would

1 cause successive dominoes to fall in the county?

2 **A** Yes. That's absolutely right.

3 **Q** And you can't segregate out one domino from the rest  
4 once you've started that process?

10:25:10 5 **A** That's right.

6 MR. LANIER: All right. With that, Your  
7 Honor, I'll pass the witness.

8 And thank you for this time.

9 THE COURT: Okay. I think it would be a  
10:25:18 10 logical time to take our midmorning break.

11 So recess for about 15 minutes, and we'll pick up with  
12 cross-examination.

13 (Recess taken at 10:25 a.m.)

14 (Court resumed at 10:48 a.m.)

10:48:53 15 THE COURT: Okay.

16 MR. DELINSKY: Your Honor, CVS moved over  
17 here, due to the demonstrative, if that's okay, Your Honor.

18 THE COURT: That's fine.

19 MR. LANIER: And, Your Honor, I do think, and  
10:49:06 20 it's not so much important on the record, but interested in  
21 finding out, we do have two jurors who have come back to  
22 watch this who are in the back.

23 THE COURT: Right. Yes. I understand that.  
24 And I appreciate their interest.

10:49:20 25 Okay.

1 MR. HALL: May I proceed, Your Honor?

2 THE COURT: Yes. Yes.

3 **CROSS-EXAMINATION OF KATHERINE KEYES**

4 **BY MR. HALL:**

10:49:32 5 **Q** Good morning, Dr. Keyes. We spoke briefly about five  
6 minutes ago, introduced ourselves.

7 I want to start by asking you about a subject that was  
8 touched on in phase I, so I don't plan to spend a lot of  
9 time on it. And I expect there to be actually some vehement  
10:49:51 10 agreement on this subject. We'll see.

11 And this is the subject: Your opinions about the  
12 various substantial causes of the opioid crisis, the  
13 epidemic in Lake and Trumbull Counties, we all here know  
14 what the jury found with respect to the defendants, but you  
10:50:12 15 agree that the opioid manufacturers substantially causally  
16 contributed to the opioid burden in Lake and Trumbull  
17 Counties, don't you?

18 **A** Yes.

19 **Q** And you've testified in two other opioid cases for  
10:50:31 20 plaintiffs in cases against manufacturers of opioids,  
21 correct?

22 **A** Yes.

23 **Q** And in those cases, your opinion was, as you just  
24 described, that those opioid manufacturers were substantial  
10:50:47 25 causes of opioid crisis in other communities?

1     **A**     Yes. Yes, in addition to pharmacies and other  
2     entities.

3     **Q**     Well, and some of those cases have been exclusively  
4     against manufacturers, haven't they?

10:51:07 5     **A**     I'm not sure. It's possible.

6     **Q**     New York?

7     **A**     I believe they were distributors in that case as well.

8     **Q**     Okay. But not pharmacies, correct?

9     **A**     I don't remember right now.

10:51:16 10    **Q**     And, in fact, it's your opinion, isn't it, is that if  
11     the opioid manufacturers had acted more responsibly and the  
12     FDA had done its job, we would not even have an opioid  
13     crisis?

14    **A**     Well, certainly, you need to make opioid pills to have  
10:51:36 15    an oversupply of opioids, so, certainly, when we're thinking  
16    about that synergistic interaction, of course, you need  
17    product to distribute.

18    **Q**     Well, had the manufacturers of opioids acted more  
19    responsibly, and had the FDA done its job and not approved  
10:51:57 20    21 different opioids, we would not have an opioid crisis,  
21    fair?

22    **A**     Can you -- the question is: If opioid pills weren't  
23    created? I don't --

24    **Q**     No. The question is: Had the manufacturers of  
10:52:14 25    opioids acted more responsibly, had the FDA done its job and



1 not approved 21 different opioids, we would not have an  
2 opioid crisis.

3 You agree with that, don't you?

4 **A** Certainly I would look to the epidemiological  
10:52:32 5 literature, which indicates that there's a relationship  
6 between dose and duration of opioid pills with OUD and  
7 related harms. And so, I'm not sure what job I'm testifying  
8 to with respect to the manufacturers.

9 MR. HALL: May I approach the witness, Your  
10:52:50 10 Honor?

11 THE COURT: Okay.

12 **BY MR. HALL:**

13 **Q** I'll give you a transcript of the October 26th, 2021  
14 trial in which you testified to the jury.

10:53:12 15 And I'd like to direct you, please, to page 4153.

16 Let me know when you're there.

17 Are you on page 4153, doctor?

18 **A** Yes.

19 **Q** If you would look at line 15.

10:53:40 20 Question: Fair enough.

21 So had the manufacturer, in your view, acted more  
22 responsibly, and had the FDA done its job and not approved  
23 21 different opioids in that time frame, we would not have  
24 an opioid crisis, fair enough?

10:53:55 25 Answer: Yes.

1           Were you asked that question and did you give that  
2           answer to the jury?

3           **A**       Yes.

4           **Q**       Now, in the New York trial, you mentioned there were  
10:54:07 5           distributors. You've expressed the opinion in other  
6           courtrooms that the Big Three distributors, which I guess is  
7           Cardinal, McKesson, and ABDC, they also substantially  
8           contributed to the opioid burden in Lake and Trumbull  
9           Counties, true?

10:54:26 10          **A**       Yes.

11          **Q**       And, of course, overprescribing by doctors,  
12          overprescribing of opioids, also substantially contributed  
13          to the opioid epidemic in Lake and Trumbull Counties; you  
14          agree with that?

10:54:46 15          **A**       Yes. My view is the factors that contributed to the  
16          increase in supply are synergistically responsible.

17          **Q**       And it's your view that the opioid crisis would not  
18          have occurred if prescribing opioids had not become standard  
19          practice in managing acute and chronic care, right? Chronic  
10:55:09 20          pain, excuse me.

21          **A**       I believe that contributed to the opioid crisis.

22          **Q**       Well, it's your view that the opioid crisis would not  
23          have occurred if prescribing opioids had not become standard  
24          practice in managing acute and chronic pain, correct?

10:55:27 25          **A**       I think that that contributed to the opioid crisis,

1 yes.

2 **Q** Well, my question's slightly different. It's not  
3 whether it contributed this time.

4 It's your view that the opioid crisis would not have  
10:55:37 5 occurred if prescribing opioids had not become standard  
6 practice in managing acute and chronic pain, correct?

7 **A** I think that was a catalyzing event. So I would say,  
8 you know, certainly that the opioid crisis -- the -- those  
9 events contributed to the opioid crisis and starting it.

10:55:59 10 **Q** It would not have occurred, would it? That's the  
11 opinion you have, had prescribing doctors not become -- had  
12 prescribing opioids not become standard practice in managing  
13 acute and chronic pain, the crisis would not have happened  
14 in your view; agree?

10:56:18 15 **A** My opinion is that that increase in prescribing  
16 contributed to the oversupply. So to that extent, yes, I  
17 agree.

18 MR. HALL: May I approach, Your Honor?

19 THE COURT: Okay.

20 **BY MR. HALL:**

21 **Q** I've handed you the June 14th, 2021 trial transcript  
22 in West Virginia Federal Court.

23 Do you recall testifying in that case?

24 **A** I do.

10:57:17 25 **Q** And that was a case brought by the City of Huntington

1 and I think the Cabell County?

2 **A** Cabell.

3 **Q** Cabell.

4 Against distributors, the Big Three distributors you  
10:57:33 5 mentioned before of opioids, true?

6 **A** That's my understanding.

7 **Q** Okay. And you testified in that trial back in  
8 June 2021?

9 **A** That sounds right.

10:57:45 10 **Q** Okay. Turn to page 82, please.

11 I direct your attention to line 19.

12 Question: And then your view is that the opioid  
13 crisis would not have occurred if prescribing opioids had  
14 not become standard practice in managing acute and chronic  
10:58:11 15 pain, correct?

16 Answer: That's right.

17 Did you give that testimony under oath in that trial?

18 **A** Yes.

19 **Q** Now, you also testified back in October to the jury in  
10:58:30 20 this case about other substantial causes, such as medicine  
21 cabinet diversions.

22 Do you remember that subject?

23 **A** Yes.

24 **Q** And that also is a substantial causal factor for the  
10:58:44 25 opioid epidemic in Lake and Trumbull Counties, true?

1       **A**       Certainly medicine cabinet diversion occurs and  
2       contributed to harm.

3       **Q**       It's a substantial causal factor in Lake and Trumbull  
4       County, right?

10:58:57 5       **A**       Yes.

6       **Q**       I want to move to a different subject.

7               You testified this morning about an apportionment or  
8       some kind of allocation of opioid harms as to prescription  
9       opioids directly and indirectly attributable.

10:59:18 10       As a general subject, do you recall that testimony?

11       **A**       Yes.

12       **Q**       Now, on that subject of illicit opioids in Lake and  
13       Trumbull County and elsewhere in the country, as you're  
14       aware of it, the heroin and nonprescription fentanyl that  
10:59:39 15       are causing so many deaths and so much problem these days  
16       are trafficked into the U.S. from Mexico and China and  
17       elsewhere, correct?

18       **A**       That's my understanding.

19       **Q**       And you also agree, I take it, that those illicit  
10:59:58 20       opioids trafficked into the U.S., sold by drug dealers  
21       throughout the country, including Lake County and Trumbull  
22       County, have also contributed to the opioid epidemic in Lake  
23       and Trumbull Counties.

24               Do you agree with that?

11:00:13 25       **A**       I would.

1 Q Now, fentanyl tainting of heroin, tell us briefly what  
2 that is.

3 A So fentanyl, usually illicitly manufactured fentanyl,  
4 has been mixed in with heroin. And so, people may use  
11:00:36 5 heroin and not know there's fentanyl in it, and some people  
6 use heroin and know there's fentanyl, especially now people  
7 largely realize that there is fentanyl in heroin. But it's  
8 a mixture of heroin and fentanyl usually.

9 Q And based on your awareness of this phenomenon, who  
11:00:56 10 generally does the tainting of the heroin?

11 A Based on my understanding, that occurs -- the  
12 suppliers and distributors would do that.

13 Q The drug dealers and the drug suppliers. We're not  
14 talking about the Big Three distributors at this point or  
11:01:15 15 any of the defendants or manufacturers. We're talking about  
16 drug cartels and drug dealers?

17 A My understanding, yes. The people who distribute  
18 illicitly manufactured heroin and fentanyl would be involved  
19 in the production of it.

11:01:32 20 Q And do you agree that since 2015 or so, in Lake and  
21 Trumbull Counties, the fentanyl tainting of heroin, fentanyl  
22 tainting of cocaine and other illegal drugs by drug dealers  
23 has become a huge problem in Ohio and elsewhere?

24 A Yes.

11:01:50 25 Q Do you also agree that since 2015, by far most opioid

1 deaths in Ohio are due to fentanyl and other synthetic  
2 opioids?

3 **A** It's, you know, increased across time. You know,  
4 certainly now most heroin -- most opioid deaths involve  
11:02:06 5 fentanyl. And it's been, you know, an increase in that  
6 slope since about 2015.

7 **Q** In your report, I think you describe it as an  
8 exponential increase; is that fair?

9 **A** Yes.

11:02:17 10 **Q** And that's about -- since about 2015 or so?

11 **A** Yes.

12 **Q** Now, I want to move -- on the subject of illicit  
13 opioids, I want to move to your testimony this morning about  
14 the mortality in Lake and Trumbull County, the overdose  
11:02:41 15 deaths that you attribute directly to prescription opioids,  
16 and then you said there was a category you attribute  
17 indirectly to prescription opioids.

18 Do you recall that testimony?

19 **A** Yes.

11:02:52 20 **Q** I want to spend a few minutes further asking you about  
21 that question. You touched on it this morning. And I want  
22 to actually walk through the estimates you made that  
23 supported your report.

24 **A** Sure.

11:03:07 25 **Q** Now, we have two categories, if I followed your

1 testimony, opioid harms that are directly attributable to  
2 prescription opioids. And in the case of mortality, you  
3 said you looked at death certificates, and if a prescription  
4 opioid was listed as a cause, solely or one of many, that  
11:03:33 5 you counted as direct attribute -- directly attributed to  
6 prescription opioids, fair?

7 **A** Yes. And to be clear, that's based on the T codes,  
8 the contributing cause codes on the cause of death  
9 certificate, and I used several of those T codes.

11:03:47 10 **Q** Okay. And by the T codes, these are codes -- are they  
11 used by the CDC or are they used by the local medical  
12 examiners?

13 **A** They're mostly used by the CDC.

14 **Q** Okay. And there are codes -- T40.1, for example, is  
11:04:01 15 heroin?

16 **A** That's right.

17 **Q** 40.2, is that nonsynthetic opioids, like -- which  
18 would include prescription or --

19 **A** It includes prescription. It's in my report. It's  
11:04:15 20 either semisynthetic or nonsynthetic.

21 **Q** And T40.3 is also included within your definition of  
22 prescription --

23 **A** That's right.

24 **Q** -- opioids?

11:04:25 25 And T40.4 is fentanyl?



1       **A**       T40 --

2       **Q**       Synthetics. I'm sorry.

3       **A**       T40.4 is synthetic. And so, I included a portion of  
4       those based on pre-2015 levels.

11:04:38 5       **Q**       Okay. And not to spend too much time on that.

6       You did that because fentanyl sometimes is prescribed?

7       **A**       Yes.

8       **Q**       Okay. But can we all agree that the fentanyl problem  
9       today and since about 2015 has been with respect to illicit  
11:04:55 10       fentanyl, not the prescribed, or at least the overwhelming  
11       majority of the problem with fentanyl is with illicit, not  
12       prescribed?

13       **A**       Certainly the increase in drug overdose deaths has  
14       been driven by illicitly manufactured synthetic opioids,  
11:05:15 15       including fentanyl. Although, prescription fentanyl is  
16       still a problem too.

17       **Q**       Okay. But the fentanyl tainting you were describing,  
18       that's the -- in the illicit category?

19       **A**       Illicitly manufactured fentanyl has been adulterated  
11:05:31 20       in the heroin supply, from my -- that's what the scientific  
21       literature indicates.

22       **Q**       Okay. So you looked at the T codes that you just  
23       described, and if there was a T code on the death records --  
24       and they have these records by county, as I understand it;  
11:05:45 25       is that right?

1       **A**       Yes.

2       **Q**       Okay. So you examined Lake County and Trumbull County  
3 for various years and counted the number of the T codes that  
4 you determined were prescription opioids; is that fair?

11:06:02 5       **A**       That's fair.

6       **Q**       Okay. And even if there was on the death record  
7 heroin, fentanyl, and a prescription opioid, you counted  
8 that as a prescription opioid directly attributed death,  
9 that is, directly attributed to prescription opioids?

11:06:23 10       **A**       If a prescription opioid was a contributing cause of  
11 the death, I considered that directly attributable.

12       **Q**       Understood.

13               And that's the directly attributable count that you  
14 made in Lake County and Trumbull County?

11:06:37 15       **A**       Yes.

16       **Q**       Okay. Now, moving to the indirectly attributable,  
17 which is the second category you said you counted and you  
18 attributed to prescription opioids. I want to ask you about  
19 your method for that count. Okay?

11:07:00 20       **A**       Sure.

21       **Q**       Now, if I understand your report and your testimony  
22 this morning, you looked at, again, Lake County and Trumbull  
23 County death records. And for this indirectly attributed to  
24 prescription opioids category, you had included a portion, I  
11:07:29 25 think it was 53 percent, of the death records that did not

1 list a prescription opioid but listed a synthetic, a heroin  
2 or fentanyl, as indirectly attributed to prescription  
3 opioids.

4 **A** 53.4 percent to be --

11:07:47 5 **Q** Thank you.

6 **A** -- fair.

7 **Q** And -- so just to be clear, the death record where the  
8 medical examiner determined the cause of death did not list  
9 a prescription opioid but you are including in your category  
11:08:02 10 of indirectly attributed to prescription opioid deaths in  
11 Lake and Trumbull County, 53.4 percent of those heroin,  
12 fentanyl, or other synthetic deaths?

13 **A** Yes.

14 **Q** Okay. And you're doing that, just so there's no -- I  
11:08:23 15 think it's fair to explain, you're doing that because of  
16 your view about the gateway that you testified to the jury  
17 about and the transitioning from prescription opioids to  
18 heroin or fentanyl; is that accurate?

19 **A** Well, it's not a view. I mean, it's based on the  
11:08:47 20 scientific literature. There's consensus that prescription  
21 opioid use is a cause of heroin use.

22 **Q** Okay.

23 **A** So I would say it's based on my assessment of the  
24 literature.

11:08:58 25 **Q** All right. So with that qualification that you make,

1 it is -- it is an effort for you to account for the gateway,  
2 we'll just call it the gateway or the transition, in your  
3 counting of the mortality in Lake and Trumbull Counties.

4 Is that an accurate statement?

11:09:21 5 **A** Generally, yes.

6 **Q** Okay. Now -- and just to be clear, when you  
7 categorized or counted a death in Lake and Trumbull County  
8 where the medical records said heroin or fentanyl, you did  
9 not go yourself and examine any other medical records or  
11:09:44 10 determine whether the person involved, the deceased, had  
11 actually ever started with prescription opioids and  
12 transitioned. You were doing this based on your view of the  
13 literature; is that correct?

14 **A** I use the literature to inform an estimate.

11:10:03 15 **Q** Okay. Now, I'd like to actually go to your  
16 conclusions for your counts. And this may require -- I  
17 notice you have some materials up there.

18 Is that your report?

19 **A** Yes.

11:10:19 20 **Q** Do you also have your various backup, your Excel, at  
21 least the printouts of them?

22 **A** Yes.

23 **Q** Okay. Because I'd like to walk through those. And if  
24 at any time you don't have one of them handy, just let me  
11:10:32 25 know, and I'll either show it or give you a hard copy.

1 Okay?

2 **A** Okay.

3 **Q** But I want to get an accurate count of your tally and  
4 record of the mortality attribution that you may think that  
11:10:50 5 is, in your opinion, attributable to prescription opioids.

6 Okay?

7 **A** Okay.

8 **Q** All right.

9 MR. HALL: So I think the best way to do this,  
11:10:59 10 with the Court's permission, if I could just draw on the  
11 board and write down as Dr. Keyes testifies.

12 THE COURT: That's fine.

13 MR. HALL: I'm going to do it here. I  
14 apologize. The first one's going to be here, but I want  
11:11:15 15 Dr. Keyes to be able to see it.

16 Maybe I'll go back here. I have a microphone.

17 MR. DELINSKY: It's okay, Jeff.

18 **BY MR. HALL:**

19 **Q** And I will turn it to you so you can see it, but at  
11:11:27 20 times I'm going to need to lean it on here and write it.

21 So what I would like to ask you about -- is that large  
22 enough for you to read?

23 **A** Yes.

24 **Q** Yeah, at least at the start, that's too tall.

11:11:46 25 Okay. So this is Dr. Keyes' estimates, opioid

1 mortality. And I'm going to focus on the period, but  
2 you're -- I don't mean to constrain you to the extent you  
3 want to talk about other years. I'm going to focus on the  
4 period starting with 2015. And, as I understand it, you  
11:12:25 5 have at least five years of data there.

6 I noticed in your chart, and in your testimony this  
7 morning, you said there are some years before then where  
8 there's missing data, at least in Trumbull County.

9 But I'm going to focus on the period 2015 and later,  
11:12:41 10 which I understand your report, you have data through 2019.

11 Is that accurate?

12 **A** That's accurate.

13 **Q** Okay. And so, in your backup, you have total opioid  
14 deaths for Lake and Trumbull; am I right about that?

11:13:16 15 **A** Yes.

16 **Q** Okay. And let me give you a calculator, because I'm  
17 going to ask you to bear with me and add up to five years of  
18 data. This has a battery, so it shouldn't be a problem with  
19 the light.

11:13:42 20 **A** Could I have a pen too?

21 **Q** Of course.

22 Can I slip it under the window there?

23 **A** Sure.

24 **Q** If you would for me, please -- and this is -- this is  
11:13:57 25 backup to figure 14; am I right?

1       **A**       Yes.

2       **Q**       And Mr. Lanier showed figure 14 and asked you about  
3       it, and so, this is the backup that helped build that chart  
4       or that figure in your report?

11:14:10 5       **A**       Yes.

6       **Q**       All right. Looking at your figure 14 backup, the  
7       printout of the Excel, am I right that there are -- let me  
8       get my copy of that so I get this accurate.

9               Now, the first page of those two pages --

11:14:34 10              MR. LANIER: May I ask that you identify an  
11       exhibit number so we're all looking at the same thing,  
12       please.

13              MR. HALL: It's the -- the exhibit number  
14       is -- it was marked by the plaintiffs last night and --

11:15:04 15              THE COURT: Well, we've got -- Mr. Hall, we've  
16       got three reports of Dr. Keyes. I guess we just need to  
17       know which one.

18              MR. HALL: Yeah. Well, this is the backup,  
19       Your Honor, for her primary report, which is PX --

11:15:19 20              THE COURT: It's 23116 I think is her primary  
21       report.

22              MR. HALL: Yes. And this is included, the  
23       figure 14 backup is tab A -- yes, thank you -- to  
24       Plaintiffs' 23118.

11:15:37 25              THE COURT: Tab A to 23118?

1 MR. HALL: 23118. Tab A or tab 1?

2 It's tab 1.

3 THE COURT: Okay.

4 MR. LANIER: Thank you.

11:15:49 5 MR. HALL: Thank you.

6 **BY MR. HALL:**

7 **Q** Now, there are a number of counts in this printout,  
8 and I'm sure you're quite familiar, far more familiar than I  
9 am, Dr. Keyes, but am I right that one of the counts by year  
11:16:14 10 by county is the all opioids count?

11 **A** Yes.

12 **Q** Let me -- actually, so there's a little less mystery,  
13 let me allow everybody to see this.

14 Okay. Do you see on your screen the Excel printout  
11:16:55 15 that we're discussing here?

16 **A** Yes.

17 **Q** Okay. And we can see on the first page -- and this is  
18 just the way the Excel prints out, I guess -- we see the  
19 title columns on the first page but not the second page, and  
11:17:09 20 the data, the actual counts that you made, are on the second  
21 page for Lake County and Trumbull County, correct?

22 **A** That's right.

23 **Q** Okay. So if I go to the second page on the screen  
24 here, and we look at the column -- let's see -- am I right  
11:17:31 25 that this column right here has a count you made -- excuse



1 me -- of all opioid deaths in Lake County from 2015 to 2019?

2 Am I highlighting the right numbers?

3 **A** Yes.

4 **Q** All right. And if we look down to Trumbull County, we

11:18:01 5 see same column, have I highlighted there on the second page

6 the 2015 through 2019 Trumbull County all opioid deaths?

7 **A** Yes.

8 **Q** Per your count of the records?

9 **A** Yes.

11:18:16 10 **Q** Okay. Now, if you wouldn't mind taking the calculator

11 and adding up the total opioid deaths for first Lake County

12 and then Trumbull County for 2015 to 2019, please.

13 **A** I get 350 for Lake County.

14 **Q** All right. And if you would please do the same for

11:18:47 15 Trumbull County.

16 MR. HALL: With the Court's permission, I'm

17 going to come back over here so I don't have to keep walking

18 back and forth for a minute.

19 THE WITNESS: I get 446.

20 **BY MR. HALL:**

21 **Q** All right. So these are, per your count, the total

22 number of opioid deaths in Lake County and Trumbull County

23 for five years starting in 2015 from any kind of opioid?

24 **A** Yes.

11:19:21 25 **Q** Okay. Now, is the next column -- what is the next

1 column of data next to the all opioid deaths, next to the  
2 highlighted ones that I'm showing on the screen, the second  
3 page of Plaintiffs' Exhibit 23118, tab A?

4 **A** Those are the deaths that I designate as directly  
11:19:45 5 attributable to prescription opioids.

6 **Q** Okay. So for Lake County, it was 20, for example, in  
7 2015, and then 18 in 2019, just to make sure we're on the  
8 same page?

9 **A** Uh-huh.

11:19:57 10 **Q** And then if we go down to Trumbull, it ranges from 13  
11 to 24.

12 These are the directly attributable, where there was  
13 some indication on the death record of an opioid categorized  
14 as a prescription opioid, right?

11:20:16 15 **A** That's right.

16 **Q** All right. Tell me, please, the numbers you add up  
17 for those years for each county.

18 **A** For Lake County, I counted 97. And for Trumbull, I  
19 counted 94.

11:20:33 20 **Q** And I'm writing on the board here directly  
21 attributable, and I'll put RX, meaning your opinion is these  
22 were directly attributable to prescription opioids?

23 **A** Yes.

24 **Q** Okay. And it's 97 in Lake, 94 in Trumbull.

11:20:52 25 Okay. Thank you for bearing with me.

1 Now, what is the next column?

2 **A** The next column is the -- the total number of deaths  
3 minus the directly attributable.

11:21:12

4 **Q** Is there a column for the total due to illicit  
5 opioids?

6 **A** Well, I mean, this -- I guess this column is deaths  
7 due to nonprescription opioids so --

8 **Q** Okay. Fair enough.

11:21:30

9 And that's -- looking at page one, have I highlighted  
10 that column?

11 **A** Yes.

12 **Q** And again, on page two, the columns aren't there, it's  
13 just a function of the Excel printout?

11:21:41

14 **A** Yes. It's the total number of deaths minus the ones  
15 that I directly attributed to prescription opioids.

16 **Q** Okay. So have I highlighted here the ones in the  
17 column that you said were due to nonprescription opioids for  
18 Lake?

19 **A** Yes.

11:22:04

20 **Q** So I'll put on here, I'll try to follow your column,  
21 it's due to non-RX opioids.

22 Fair enough description?

23 **A** Yes.

11:22:20

24 **Q** All right. If you could give me the two figures for  
25 Lake and then Trumbull.

1       **A**       I get 253 for Lake.

2       **Q**       And Trumbull?

3       **A**       I get 352. I assume someone's checking my math, in  
4 case --

11:22:43 5       **Q**       Well, I have to say, I feel like you're checking mine,  
6 but I have to say I agree.

7                   THE COURT: Well, mine agrees. That's pretty  
8 simple. I can still do that.

9       **BY MR. HALL:**

11:22:56 10       **Q**       And in the next column is what?

11       **A**       Those are the number of deaths due to nonprescription  
12 opioids times .574, 57.4 percent.

13       **Q**       57 or 53?

14       **A**       I'm sorry. 53. I apologize.

11:23:14 15       **Q**       And this is what you have described as the indirectly  
16 attributable to prescription opioids?

17       **A**       Yes.

18       **Q**       All right. So I'm going to title this indirectly  
19 attributable to RX.

11:23:38 20               Is that a fair description of that one?

21       **A**       Yes.

22       **Q**       Okay. Can you give the five-year count that you made  
23 for that category in Lake and Trumbull County?

24       **A**       I get 135 for Lake. And 189 for Trumbull.

11:24:00 25       **Q**       Okay. And --

1 THE COURT: And just so I'm clear, that's the  
2 roughly 53 percent of 253 and 352?

3 THE WITNESS: That's right.

4 THE COURT: Okay.

5 **BY MR. HALL:**

6 **Q** And this then would be what you told us is your  
7 gateway -- accounting for the gateway?

8 **A** The transition, yeah, yeah.

9 **Q** Okay. I'll put transition. Are you good with that?

11:24:27 10 **A** Sure.

11 **Q** Okay. So I'm going to put that in parentheses here.

12 And now I want to ask you about a category that is not  
13 in this chart but I think follows from what you've done  
14 here.

11:24:48 15 We've counted the total opioid deaths. You've  
16 determined, according to the methods you've described, those  
17 you say are directly attributable to prescription opioids.

18 Can you see this, if I --

19 **A** Yeah, ish. I have the numbers here, so I don't think  
11:25:07 20 I need it.

21 **Q** Okay. Well, I'm going to put it up here so --

22 **A** Okay.

23 **Q** -- we don't have an issue.

24 So you took the total opioid deaths, your method for  
11:25:19 25 attributing directly to prescriptions for each county from

1 2015 to 2019. And then you have the category due to  
2 nonprescription opioids. These are deaths in those counties  
3 due to -- you determined due to nonprescription opioids.  
4 They listed heroin or fentanyl or another synthetic that you  
11:25:39 5 determined was not a prescription, correct?

6 **A** Just a clarification.

7 I mean, you -- my analysis goes back to 1999. You had  
8 said my analysis starts at 2015, so I just wanted to make  
9 that clear.

11:25:51 10 **Q** I'm sorry. I just meant the count we're --

11 **A** The count that you've done starts at 2015, but my  
12 graph goes back to '99.

13 **Q** Correct. Okay. But did I describe the due to  
14 nonprescription opioids counts here, that you have 253 for  
11:26:08 15 Lake and 352 for Trumbull, accurately?

16 **A** I think so. As long as my math was correct.

17 **Q** Okay. And then, you accounted for a transition from  
18 prescription opioids to nonprescription opioids, heroin or  
19 fentanyl or another synthetic, in Lake and Trumbull County,  
11:26:25 20 by taking 53 percent, and that's the indirectly attributable  
21 category?

22 **A** That's right.

23 **Q** Okay. So far we're on the same page.

24 Now, am I right that if we took the due to  
11:26:48 25 nonprescription opioid count in Lake County, for example,

1 the 253, and removed the 135 that you account for as  
2 indirectly attributable, we're left with a count of 118?

3 **A** I'm sorry. Can you describe what -- so you're  
4 subtracting 135 from 253?

11:27:13 5 **Q** Yes.

6 **A** Okay. So if you subtract 135 from 253, you're left  
7 with 118.

8 **Q** And these would be opioid deaths in Lake County from  
9 2015 to 2019 that you determined were due to nonprescription  
11:27:33 10 opioids but you do not attribute, either directly or  
11 indirectly, to prescription opioids; is that a fair  
12 description?

13 **A** That's right.

14 **Q** All right. So I'll write down here -- and it's 118 in  
11:28:20 15 Lake County. And is that number, 163 opioid deaths in  
16 Trumbull County from 2015 to 2019, that, based on your  
17 count, are not directly or indirectly attributable to  
18 prescription opioids?

19 **A** Well, I mean, I would just qualify that a little bit.  
11:28:40 20 Not indirectly attributable through that transition pathway.  
21 That's what I'm accounting for in that paragraph.

22 **Q** I didn't mean to interrupt you.

23 **A** I'm just -- the -- that figure is accounting for  
24 transition pathway deaths.

11:28:55 25 **Q** But at least --

1       **A**       Not all -- not all possible pathways to a heroin  
2 overdose.

3       **Q**       Okay. At least to the extent you accounted for opioid  
4 deaths in Lake and Trumbull County that you said were  
11:29:11 5 directly or even indirectly attributable to prescription  
6 opioids, 118 in Lake and 163 in Trumbull didn't meet those  
7 definitions of directly or indirectly attributable as you  
8 calculated it?

9       **A**       Yes, based on this methodology.

11:29:29 10       **Q**       All right. Thank you for walking through that.

11               I'm just going to mark this board as Walgreens -- just  
12 for identification Walgreens MDL Demo 32. And we'll take a  
13 picture. We're not -- we're just marking it for ID.

14               Now, let me move to a different subject, Dr. Keyes.

11:30:19 15               And this is also a subject you discussed this morning  
16 on your direct testimony, and that was the estimates you  
17 made of people, the number of people -- excuse me -- the  
18 number of people in Lake County and Trumbull County who have  
19 OUD?

11:30:53 20       **A**       Yes.

21       **Q**       Opioid use disorder?

22       **A**       That's right.

23       **Q**       Okay. And I think you were asked about this, but just  
24 to be clear.

11:31:11 25               Your 2019 estimate is a very important input into the



1 plaintiffs' abatement plans for Lake County and Trumbull  
2 County, correct?

3 **A** I understand that they've used my OUD calculation, but  
4 I wouldn't purport to testify to its importance.

11:31:27 5 **Q** Fair enough. And I don't want to get beyond what you  
6 know.

7 But do you at least know that Dr. Alexander, in  
8 putting together what he calls his redress model or appendix  
9 E or abatement plan, identifies the -- your 2019 OUD  
11:31:41 10 population estimate as a starting point in his plan going  
11 forward?

12 **A** Yes, I'm aware of that.

13 **Q** And you either know perhaps generally or perhaps you  
14 know more specifically for this case, but the plan that  
11:31:57 15 plaintiffs are providing for treatment and for services and  
16 infrastructure and personnel to treat OUD is a very  
17 important part of -- or very significant part of the  
18 plaintiffs' abatement plan here?

19 **A** Yeah, I'm generally aware of that.

11:32:13 20 **Q** So you're generally aware that these inputs, these OUD  
21 estimates that you made for 2019, are very important inputs  
22 to the abatement plan. I guess that's all I'm trying to  
23 establish.

24 **A** I know that they're part of the plan.

11:32:27 25 **Q** All right. Okay. We can --

1 THE COURT: Hold on.

2 Dr. Alexander's opinion as to what is important or not  
3 candidly, isn't relevant.

4 MR. HALL: Understood, Your Honor. I'll move  
11:32:39 5 on.

6 **BY MR. HALL:**

7 **Q** Now, I want to spend a little time on your method for  
8 determining -- estimating these populations that you've  
9 discussed this morning.

11:32:50 10 In your work outside of litigation as an  
11 epidemiologist, do you do survey work, that is, go into  
12 communities and do surveys of diseases or addictions or  
13 things like that? Do you ever do that?

14 **A** Yes.

11:33:07 15 **Q** In making your estimates of the population of people  
16 in Lake and Trumbull County in 2019 who have OUD, did you do  
17 any survey work in Lake or Trumbull County?

18 **A** No.

19 **Q** Do Lake and Trumbull County have data about OUD  
11:33:27 20 treatment for residents of those two counties?

21 **A** I believe that they're -- that data exists on OUD  
22 treatment.

23 **Q** And in making your estimates of the number of people  
24 in Lake and Trumbull County who have OUD, did you rely on,  
11:33:44 25 refer to, any of that data of OUD treatment in Lake or

1 Trumbull County?

2 **A** That would not be -- the number of people with OUD who  
3 seek treatment are a small proportion of people with OUD, so  
4 we couldn't rely on treatment records.

11:34:00 5 **Q** So you did not look at any data about OUD treatment in  
6 Lake and Trumbull County; is that fair?

7 **A** Not to form the OUD estimate. That wouldn't be  
8 relevant.

9 **Q** Have you ever set foot in Lake or Trumbull County?

11:34:13 10 **A** Well, during this case, it was during the COVID  
11 pandemic, so I wasn't able to -- I met with people in Lake  
12 and Trumbull County via Zoom because of the pandemic, so I  
13 have not had the opportunity yet.

14 **Q** All right. Let's look at how you estimated these  
11:34:35 15 populations of OUD, your estimates of the OUD populations in  
16 Lake and Trumbull County --

17 THE COURT: Doctor, I've got -- if I could  
18 jump in.

19 MR. HALL: Yes.

11:34:44 20 THE COURT: Are there -- is there some  
21 reliable estimate -- if you know the number of people that  
22 seek treatment, is there some reliable methodology to  
23 extrapolate the number of people who actually have disorder?  
24 Like, someone has research that says, all right, 20 percent  
11:35:10 25 of the people who have disorder seek treatment.

1 THE WITNESS: Right.

2 THE COURT: And that's sort of an accepted --  
3 accepted figure. I'm just wondering.

4 THE WITNESS: That would be a multiplier  
11:35:20 5 method.

6 THE COURT: Right.

7 THE WITNESS: And I considered doing that, but  
8 there's no consensus, like there is --

9 THE COURT: Okay. Well, that was my question.

11:35:27 10 THE WITNESS: Right. Yeah.

11 THE COURT: Okay. Thank you.

12 **BY MR. HALL:**

13 **Q** Do you know if there is any consensus in determining  
14 if you have a population of people with OUD -- to follow up  
11:35:38 15 on the judge's question, is there a consensus on how you  
16 would estimate the number of people in that group who need  
17 treatment, in other words, the reverse?

18 **A** I guess I'm not understanding the question. If you  
19 could just repeat it.

11:35:51 20 **Q** Well, as I understood the judge's question, he was  
21 saying is there a way to extrapolate or determine, estimate  
22 a population of people with OUD in a community based on the  
23 number of people who get OUD treatment in that community.

24 Is that how you understood the question generally?

11:36:06 25 **A** Yes.

1 Q Okay. And I think you said there's no consensus on  
2 how you would do that?

3 A Well, there's a consensus on how you would do it.  
4 There's not a consensus on what proportion of people with  
11:36:18 5 OUD seek treatment in any particular area.

6 Q Okay.

7 A But if you knew that, there's consensus on how you  
8 would do it, as to how I did it.

9 Q Well, I just want to make sure we're clear.

11:36:29 10 Is there a way to do what the Judge asked, that is --

11 THE COURT: Well, there is a way to do it, by  
12 guessing. But my question was whether there's a -- that the  
13 data or the estimate, the multiplier you use, is there a  
14 consensus as to what multiplier.

11:36:50 15 THE WITNESS: Right.

16 THE COURT: And I think the doctor said no.

17 MR. HALL: Okay.

18 BY MR. HALL:

19 Q And my question goes to the converse then. Is there  
11:36:56 20 similarly a lack of consensus about how you would take a  
21 population of people with OUD if you have an estimate and  
22 estimate how many of them need treatment?

23 A You know, certainly, you'd want to -- there's the  
24 potential that everyone has OUD could benefit from services  
11:37:14 25 related to their OUD, and so, you know, certainly, I guess

1 the consensus would be that anyone with OUD should be  
2 offered, you know, some kind of services. The proportion of  
3 people who will use those services depends on the funding  
4 available to get people in the door.

11:37:31 5 **Q** Doesn't it also depend on individual decisions about  
6 whether they need or want treatment? Would you agree with  
7 that?

8 **A** Some people might not decide that they want treatment,  
9 but, certainly, we have a lot of programs that can provide  
11:37:45 10 people with OUD with information on the types of services  
11 that they would be -- that they would benefit from, so the  
12 idea would be to kind of increase the proportion of people  
13 who are using treatment services through funding and  
14 outreach investments over time.

11:38:02 15 **Q** Now, the multiplier method that you did use in this  
16 case is for -- is pursuant to a formula that you described,  
17 and I want to write it out to make sure that we are on the  
18 same page and it's clear in the record.

19 So I'm going to start another board, and I will call  
11:38:21 20 this Dr. Keyes' multiplier formula.

21 And if I understood you correctly, this is -- is it a  
22 form of algebra?

23 **A** You could say that.

24 **Q** Okay. And if you have the drug overdose deaths, the  
11:38:59 25 total count in the community, and if you also have OUD,

1 whatever the population of interest overdose death rate --  
2 and I'll put here in P for plaintiff, because that's what  
3 we're looking at here for these estimates, right?

4 **A** Yes.

11:39:33 5 **Q** If you have those two numbers, the number of people  
6 who died of overdose in a community -- and we're talking  
7 about any drug overdose, not just opioids here, right?

8 **A** Right.

9 **Q** And you know the death rate of overdose for people who  
11:39:55 10 have OUD. You divide the total deaths by the rate, and  
11 you're going to get an estimate of the number of people --  
12 excuse me -- number with OUD in the plaintiff county.

13 Is that a fair depiction of the basic math of the  
14 multiplier method?

11:40:21 15 **A** Well, as we discussed earlier, I modified that formula  
16 to include changes in lethality and changes in the  
17 prevalence of fentanyl use in the county.

18 **Q** And I will come to that, and we'll go through that in  
19 detail.

11:40:33 20 **A** Okay.

21 **Q** But I just want to make sure that we understand the  
22 basic concept before we do.

23 Does the drug overdose death count in a community,  
24 divided by the OUD death rate in that community, leave you  
11:40:47 25 with an estimate of the number of people with OUD in that

1 community?

2 **A** Again, with the modifications.

3 **Q** Sure.

4 **A** So that's not exactly accurate, I guess --

11:40:58 5 **Q** Well, is this an accurate starting point before the  
6 modifications?

7 **A** We could start there.

8 **Q** Okay. And just to show the way the variables work and  
9 interact, I want to take two simple examples.

11:41:10 10 Example one is, let's say we have a community that has  
11 ten overdose deaths, and we know in that community the OUD  
12 overdose death rate is one percent. And I remember from  
13 math you need to add the decimal points. But we have ten  
14 people who die of overdose in that community, and the OUD  
11:41:44 15 rate is one percent.

16 Your estimate in that case, this hypothetical example  
17 but just to show how the math works, would be that there  
18 would be a thousand with OUD in that community; is that  
19 right?

11:41:56 20 **A** That's right.

21 **Q** Okay. And let's look at a second example.

22 The second example, we have same community, same  
23 number of overdose deaths, and instead, the overdose death  
24 rate of those with OUD in this community is two percent, so  
11:42:43 25 we divide by .02.



1 Am I right then, the estimate -- excuse me -- the OUD  
2 population estimate -- I keep wanting to put a comma in  
3 there -- would be 500?

4 **A** Yes.

11:43:06 5 **Q** And this points out, I think just a whole lot of math  
6 here that I think you'll agree with, in the multiplier  
7 formula, it's true that the higher the OUD overdose death  
8 rate, the lower the population.

9 That's just the way the math works; is that true?

11:43:26 10 **A** That's just a function of the formula, yes.

11 **Q** Okay. Now, you mentioned your modification. Let me  
12 mark this one as Walgreens Demo 33. And this is titled  
13 Dr. Keyes' Multiplier Formula.

14 And I may refer to this, so I want to leave it so you  
11:44:09 15 can see it, Dr. Keyes.

16 Can you see it?

17 **A** Yep, I can see it.

18 **Q** Okay. Now, I want to move to how you applied the  
19 formula here, because you mentioned the modification, and  
11:44:36 20 what we have on demo 33 is just the starting point, the  
21 basic math. Fair?

22 **A** Fair.

23 **Q** Okay. So this one -- and I want to focus on -- I  
24 should have written this on 33. I want to focus on 2019.  
11:44:52 25 And I think it was clear in your testimony today, but just

1 to be crystal clear why we're focusing on that.

2 That's the year in which your population estimate of  
3 OUD is used by Dr. Alexander to project forward.

4 Do you understand that?

11:45:08 5 **A** Yes. That's my understanding.

6 **Q** Okay. So, now, if we moved -- if we moved to what  
7 your application -- your actual application of this method  
8 here, let's write that out on this board so we can see the  
9 math.

11:45:29 10 And this is -- I'm going to call this one Dr. Keyes'  
11 2019 OUD calculation.

12 And you made two calculations, one for each county,  
13 right?

14 **A** Yes.

11:46:01 15 **Q** So we'll start with Lake County.

16 And by the way, let me know if you need to refer to  
17 your backup materials for any of this. It's not a memory  
18 test.

19 **A** I'm very familiar with the formula at this point, but  
11:46:14 20 I will refer to it if I need to.

21 **Q** All right. I had the impression you are.

22 All right. You started then with the drug overdose  
23 deaths in Lake County, that numerator in demo 33, right?

24 **A** Yes.

11:46:32 25 **Q** And do you recall -- yeah, do you recall the number of

1 drug overdose -- overdose deaths in Lake County in 2019?

2 **A** Not -- let's see, I already have failed the memory  
3 test.

11:46:49

4 I don't remember off the top of my head, but we can  
5 look it up in the backup materials.

6 **Q** Yeah. Please do.

7 **A** Okay.

8 **Q** If you need any information, let me know.

9 Are you referring to your Excel chart?

11:47:05

10 **A** Yes.

11 **Q** Okay. I can also put that on the screen here. This  
12 is just the native Excel file from your backups.

13 Would that help?

14 **A** Sure.

11:47:15

15 MR. LANIER: Which page?

16 **BY MR. HALL:**

17 **Q** Which page would be the best help? Is it the figure  
18 12 in table two backup?

11:47:31

19 **A** Yes. So at the top it says Drug Overdose Death, CDC  
20 WONDER. If you scroll over to column -- there was go.

21 **Q** Okay.

22 **A** And it has Lake County starting on line ten and  
23 Trumbull County starting on line 11.

24 **Q** Okay. Let me ask you to just pause there so we get  
11:47:41 25 this in the record.

1 This is part of Plaintiffs' Exhibit 23118.

2 And you said it was figure 12 in tab two backup?

3 **A** Yes.

4 **Q** Which is tab three in Plaintiffs' 23118, just for the  
11:47:57 5 record and anybody's following along.

6 Now, does this Excel from your backup material help  
7 you identify or recall the number of drug overdose deaths --  
8 let's try that again -- drug overdose deaths in Lake County  
9 in 2019?

11:48:18 10 **A** I believe it's 79.

11 **Q** All right. Now, that's the numerator, and that's a  
12 number -- where did you get 79?

13 **A** From the CDC's national vital statistics service.

14 **Q** All right. And while we're at it, why don't we put  
11:48:38 15 the numerator for Trumbull County in 2019, which would be  
16 the drug overdose deaths in Trumbull County that year.

17 Do you have that number?

18 **A** 103.

19 **Q** And did that also come from the CDC source you just  
11:48:56 20 mentioned?

21 **A** Yes.

22 **Q** All right. So we have the numerator from the CDC  
23 source.

24 Now, am I right, Dr. Keyes, when we go to the  
11:49:07 25 denominator, there is not a ready source for the OUD

1 overdose death rate in Lake County or Trumbull County?

2 **A** Like a county specific estimate? No. I relied on a  
3 meta-analysis.

11:49:34

4 **Q** Yeah. And in fact, there's not a Ohio specific death  
5 rate for those with OUD for overdose, right?

6 **A** Not as far as I know.

7 **Q** And is there a U.S. OUD overdose death rate for 2019?

8 **A** There were some U.S. data sources in the  
9 meta-analysis, but none went through 2019.

11:49:54

10 **Q** Okay. And we'll get to the meta-analysis.

11 So in the absence of having a source like you did for  
12 the numerator, for the denominator, you used this multiplier  
13 method to estimate that OUD overdose rate for Lake and  
14 Trumbull County?

11:50:13

15 **A** Yes.

16 **Q** All right. Now, why don't I allow you to tell us what  
17 that denominator is, and then I'll try to translate to the  
18 math, I think I can do can it, and we can see how the  
19 calculation worked.

11:50:27

20 **A** So the denominator has two different rates. One rate  
21 is the death rate identified in the meta-analysis. And then  
22 I multiplied that death rate by three as my estimate of the  
23 change in lethality in the kind of post-fentanyl years.

24 **Q** All right. Let me stop you there to follow up.

11:50:51

25 The meta-analysis you're referring to is a -- an

1 article by a Dr. Larney that analyzed, for purposes of death  
2 rates from overdose, 56 different studies?

3 **A** In the -- the figure for the overdose death rate?

4 **Q** Yeah.

11:51:14 5 **A** That sounds about right. We can look at it, but I  
6 trust that you've got it.

7 **Q** Well, we'll come to it in a minute because I'm going  
8 to follow up on it.

9 And then, do you remember that that rate was about  
11:51:26 10 half a percent? .52 percent?

11 **A** No.

12 **Q** .0052?

13 **A** Well, it's not a percent. It's a rate. So it's per  
14 person year.

11:51:38 15 **Q** Okay.

16 **A** It's a -- a rate always involves time in the  
17 denominator and not a percent.

18 **Q** Okay. So am I right that it is .0052?

19 **A** Yes.

11:51:50 20 **Q** When you do the -- and we'll see it, and Larney I  
21 think expresses .52; is that right?

22 **A** Per hundred person year.

23 **Q** Okay.

24 **A** So it just depends on you can do for one person year,  
11:52:04 25 for a thousand person year, a hundred thousand.

1 Q Okay. So if I put in the denominator this Larney  
2 rate, that's .0052. Is that accurate?

3 A Yes.

4 Q And you said you used that rate for a portion of your  
11:52:21 5 estimate.

6 What portion did you use the Larney rate for?

7 A I weighted that rate --

8 Q Okay.

9 A -- by the proportion of overdose deaths that involved  
11:52:34 10 synthetic opioids -- that did not involve synthetic opioids.  
11 That one is weighted by the proportion that did not involve  
12 synthetic opioids.

13 Q And for the portion of the overdose deaths that you  
14 estimated were due to synthetic opioids, you said you  
11:52:52 15 tripled Larney, the .052?

16 A Yes.

17 Q .0052.

18 Okay. So there's two rates, you've told us that, and  
19 the first is for nonsynthetic. And the second, the tripled  
11:53:09 20 rate, is for your estimate of the portion that is due to  
21 synthetic opioids?

22 A Yeah. It's a weight. It's a -- you know, you weight  
23 these estimates based on the contribution of synthetic  
24 opioids to overdose deaths in that year.

11:53:31 25 Q And so, we need to know what your estimate was of the

1 nonsynthetic portion of the 79; is that what we're talking  
2 about?

3 **A** Yes.

4 **Q** And what was your estimate of the number out of the 79  
11:53:55 5 approximately that were due to nonsynthetic opioids?

6 **A** So in Lake County in 2019, 22 percent of the overdose  
7 deaths did not involve synthetic opioids.

8 **Q** Okay. So you used the Larney rate for 22 percent of  
9 the Lake County OUD overdoses in 2019?

11:54:22 10 **A** Yeah. I weighted that estimate by a factor of  
11 22 percent.

12 **Q** Okay. And does that mean that you used the triple  
13 Larney rate for the other 78 percent?

14 **A** Yes.

11:54:33 15 **Q** Okay. And so, you end up, is it fair to say, with a  
16 blended rate effectively?

17 **A** That's not how -- that's not a term that we would use  
18 in epidemiology.

19 **Q** All right. Well, let's continue with the math.

11:54:49 20 And you have the calculator there. And please tell me  
21 what the denominator totals to so we can finish the  
22 calculation of your estimate.

23 **A** I get 0.013312. But someone should double-check that  
24 I'm adding correctly.

11:55:38 25 **Q** Well, that's what I got.



1       **A**       Okay.

2       **Q**       But it took me a number of times.

3       **A**       Great.

4       **Q**       I'm confident, because -- and here's how we check.

11:55:46 5               If you divide the numerator of 79 overdose deaths in  
6       Lake County in 2019 by that .013312, what do you get?

7       **A**       5934.5.

8       **Q**       All right. And do you recognize that as the accurate  
9       depiction of your population estimate for OUD in Lake County  
11:56:23 10      for 2019?

11      **A**       Yes.

12      **Q**       Okay. So that confirms we did this math consistent  
13      with your application, fair?

14      **A**       Yes.

11:56:32 15      **Q**       All right. Let's do the same thing -- well, let me  
16      ask you this.

17              To estimate the numerator, did you do this same kind  
18      of weighting between Larney for the nonsynthetic opioid  
19      deaths and triple Larney for the synthetic?

11:56:51 20      **A**       Yes.

21      **Q**       All right. And what were the weights you assigned to  
22      estimate that denominator?

23      **A**       In Trumbull County in 2019, 19 percent of drug  
24      overdose deaths did not involve synthetic opioids.

11:57:11 25      **Q**       All right. And so, I guess that means 81 percent did

1 involve synthetic opioids, according to your count?

2 **A** According to the CDC WONDER data I would say.

3 **Q** Fair enough.

4 So -- and, of course, this is consistent -- when we're  
11:57:32 5 seeing in Lake and Trumbull County in 2019 nearly 80 percent  
6 of the deaths are related to synthetic opioids, that's  
7 consistent with the exponential increase in the synthetic  
8 deaths that your report describes?

9 **A** Yes. It increased in, for example, in Trumbull County  
11:57:58 10 from 30 percent of deaths involving synthetic opioids in  
11 2015 to 81 percent in 2019 for example.

12 **Q** Okay. Now, if you wouldn't mind doing the same kind  
13 of number crunching with the calculator.

14 Let's finish the calculation, your calculation of the  
11:58:18 15 OUD population in Trumbull County, please.

16 **A** Okay. So I get for the denominator 0.013624.

17 **Q** Okay. Let me catch up to you.

18 .013624. All right.

19 And to confirm that the math along the way is right,  
11:58:46 20 give us, please, the calculation, your calculation of the  
21 Trumbull County OUD population for 2019.

22 **A** 7,560.

23 **Q** Okay. And do you recognize that as being your  
24 estimate of that population for 2019?

11:59:06 25 **A** Yes.

1       **Q**       Okay. So the board has the math right?

2       **A**       Yes.

3       **Q**       The board that I'm going to mark as Walgreens Demo 34.

4                   MR. HALL: Your Honor, let me pause here. I  
11:59:23 5       don't know what the Court --

6                   THE COURT: Yeah. This might be, if it's a  
7       good time, Mr. Hall, because I do have two criminal matters  
8       at noon, and I try to be punctual.

9                   So we will recess for lunch and pick up with the  
11:59:36 10       balance of Dr. Keyes' testimony.

11                   MR. HALL: When would you like us to return,  
12       Your Honor?

13                   THE COURT: 1:00 is fine.

14                   MR. HALL: Do we need to clear the desk?

11:59:48 15                   THE COURT: No. No. We're still doing  
16       criminal matters remotely. So the next two weeks, I don't  
17       think you'll have to clear anything out.

18                   MR. HALL: All right. See you at 1:00.

19                   (Recess taken at 12:00 p.m.)

20                   - - -

21

22

23

24

25

1 A F T E R N O O N S E S S I O N

2 - - -

3 (Court resumed at 1:05 p.m.)

4 THE COURT: Doctor, you're still under oath  
13:05:55 5 from this morning.

6 THE WITNESS: Okay.

7 THE COURT: Okay. We can continue the  
8 cross-examination.

9 MR. HALL: Thank you, Your Honor.

10 **BY MR. HALL:**

11 **Q** Good afternoon, Dr. Keyes.

12 I'd like to go back to demonstrative 34, the board we  
13 created this morning titled Dr. Keyes' 2019 OUD Calculation,  
14 which shows the formula that you used in order to estimate  
13:06:31 15 the OUD populations in Lake and Trumbull Counties. Correct?

16 **A** Yes.

17 **Q** All right. Now, I was asking about, I think I might  
18 have used the term "blended rate," and that's a term that  
19 you -- I think you said you're not comfortable using.

13:06:47 20 Would it be fair to describe a weighted rate of about  
21 1.3 percent, 1.33 percent for Lake County and 1.36 percent  
22 for Trumbull County, as the weighted rate of the OUD OD  
23 death rate in those two counties under your method?

24 **A** I'm sorry. So you're asking whether it would be  
13:07:20 25 accurate to call it -- call the denominator a weighted rate?

1 Q Yes.

2 A Yes.

3 Q Okay. And so, we started with Larney, which was the  
4 .52, and then you tripled it, which would be 1.56, and we  
13:07:40 5 end up with a weighted rate of about 1.33 percent for Lake  
6 County?

7 A For 2019.

8 Q For 2019. Thank you.

9 A Yes.

13:07:49 10 Q So I'm going to write 1.33 --

11 A Well, it's not a percent.

12 Q Okay. Sorry. You told me that before. 1.33 weighted  
13 rate.

14 Is that the way to phrase it?

13:08:02 15 A Sure.

16 Q For Lake County. And a 1.36 weighted rate for  
17 Trumbull County.

18 And, again, this then is the denominator of your OUD  
19 population calculation on demonstrative 34?

13:08:30 20 A Yes.

21 Q Okay. Now, I want to ask you a bit more about the  
22 components of the denominator. And you referred this  
23 morning to the meta-analysis where you got the rate of  
24 the .0052. And that was the Larney meta-analysis, right?

13:08:53 25 A Yes.

1 Q Excuse me a minute.

2 Can you see the board okay?

3 A Yes.

4 Q All right. Now, Larney involved a meta-analysis for  
13:09:08 5 this rate we're describing that you used as a component of  
6 the denominator based on 56 studies?

7 A Again, I don't remember offhand if it was 56, but I  
8 trust that you've counted. I mean --

9 Q Well, let's make sure.

13:09:27 10 A Yeah. I think it's in my report. I'll just --

11 Q Go ahead. Refer to that. And in the meantime, I'm  
12 going to pull up Larney just to make sure --

13 A Let's see, there were 56 cohorts. Well, yes. Okay.

14 Q So just to orient everyone, I'm showing on the screen  
13:09:48 15 the Larney meta-analysis you're referring to, correct?

16 A Yes.

17 Q And if we turn to what I think you were just reading,  
18 I think it's on the fourth page, it has a paragraph titled  
19 Drug-Related Deaths, and says there were 56 cohorts  
13:10:06 20 presenting data on drug-related deaths, table three, right?

21 A Yes.

22 Q That's the analysis within Larney that is this  
23 drug-related deaths that you focused on and used as a  
24 component part of your denominator in your OUD population  
13:10:25 25 calculations, correct?

1       **A**       Yes.

2       **Q**       All right. Now, I want to ask you about those 56  
3       studies. Larney being a meta-analysis, it was evaluating  
4       all 56 of them. That's essentially at a high level what a  
13:10:40 5       meta-analysis is?

6       **A**       A weighted average of the results of those 56 studies  
7       and weighted by factors like sample size.

8       **Q**       Do you know how many of those 56 studies referred to  
9       in this Larney meta-analysis involved populations outside  
13:11:01 10       the United States?

11       **A**       We can look if you have the supplements. I have  
12       examined that in a lot of detail, so I can -- I can tell you  
13       more if I have the supplement in front of me.

14       **Q**       Sure. The supplement is what you --

13:11:15 15               THE COURT: Can you just define, meta-analysis  
16       just means you've got an analysis based on a number of other  
17       studies? Is that what the term means?

18               THE WITNESS: Meta, yeah.

19               THE COURT: Okay. All right.

13:11:26 20               THE WITNESS: You take a bunch of different  
21       studies that have all looked at the same association.

22               THE COURT: That's what I thought, but I  
23       wanted to make sure. Okay. Thank you.

24       **BY MR. HALL:**

13:11:34 25       **Q**       Okay. So turning -- I'll turn to the supplement. And

1 that will tell us where the populations were from?

2 **A** That will tell us the authors and the titles. And  
3 from that, I published a paper on the peer-reviewed  
4 literature on this method. And in that published paper, I  
13:11:54 5 also go into U.S. and non-U.S. studies, and so I'm very  
6 familiar with --

7 **Q** And this is the paper pending for publication in June  
8 of this year?

9 **A** It's published.

13:12:03 10 **Q** Okay. And what was the date of the publication? I've  
11 seen one that had a June 2022 date.

12 **A** It was published I believe in early April.

13 **Q** Okay. Of this year?

14 **A** Yes.

13:12:14 15 **Q** Okay. About a month ago?

16 **A** It would be about a month ago.

17 **Q** Okay.

18 **A** So if we -- I'll know based on the titles. I can  
19 circle for you which ones, or at least I'll know with  
13:12:25 20 greater --

21 **Q** Okay.

22 **A** -- greater assurance which ones are from the U.S. and  
23 which ones are not.

24 **Q** Okay. So then let's go to the supplement that you  
13:12:34 25 referred to in your rebuttal report of a couple weeks ago,



1 right?

2 **A** Well, it's referred to in the report as well.

3 **Q** Let me show you on the screen a document titled --  
4 let's go to the first page.

13:12:52 5 **A** Yes.

6 **Q** It's titled Supplementary Online Content, and it  
7 refers to Larney, et al.

8 Is this the Larney supplement you were just referring  
9 to?

13:13:03 10 **A** Yes.

11 **Q** All right. And I think I know the page you're  
12 referring to. You tell me if I have it right. It's figure  
13 7.21?

14 **A** Yes.

13:13:14 15 **Q** That's the page?

16 **A** Yes.

17 **Q** All right. And does figure 7.21 in the Larney  
18 appendix list the 56 cohorts that Larney relied on or gave a  
19 meta-analysis of in coming to the .0052 rate that you used  
13:13:37 20 in your denominator of your multiplier formula?

21 **A** Yes.

22 **Q** Okay. And then, you mentioned a minute ago it would  
23 give the dates and the countries involved, and that's  
24 exactly what we see. And if I'm right -- am I right, and

13:13:54 25 please take a minute to confirm, that if you add up of these

1 56 studies how many involve populations in the United  
2 States, is it seven out of 56?

3 **A** That sounds about right.

4 **Q** Now, do you know if any involved Ohio?

13:14:15 5 **A** Some of the studies that are based in the U.S.  
6 included data from Ohio.

7 **Q** Okay. Did any of them exclusively rely on Ohio or was  
8 Ohio included among other states?

9 **A** Ohio was included among other states.

13:14:25 10 **Q** Okay. Now, the 49 other cohorts that Larney  
11 meta-analysis evaluated in coming to the .0052 rate, where  
12 were they from, countries all over the world?

13 **A** Yes. You can see them listed. There was Canada,  
14 France, England, Germany, Netherlands, Sweden, other  
13:14:50 15 countries.

16 **Q** Okay. And is it fair to say there were more than 20  
17 other countries represented in those 49 other studies?

18 **A** Yes. I believe -- in my published paper, I did a  
19 sensitivity analysis where I restricted only to the U.S.  
13:15:08 20 data, for example, and the results were similar. But I  
21 didn't do any restrictions to non-U.S. countries.

22 **Q** Okay. But my question wasn't about your paper, it was  
23 about --

24 **A** I apologize.

13:15:19 25 **Q** -- there's about 20 other countries in the 49 of the

1 56 studies that are not involving the U.S. in Larney, is it?

2 **A** Yeah. That sounds about right.

3 **Q** Okay. Now, let's focus on the dates of these studies.

4 We can see the dates of the publication in each of

13:15:39 5 these 56 listed on figure 7.21 in the Larney appendices.

6 Am I right that sometimes the date of the publication

7 postdates the date of the actual data of a study?

8 **A** Yes.

9 **Q** All right. Have you taken a look at, with respect to

13:16:03 10 the seven U.S. studies in the 56 that Larney evaluated here,

11 the dates of those populations?

12 **A** Yes.

13 **Q** And is it fair to say they go back in some cases to

14 the 1980s?

13:16:21 15 **A** Yes.

16 **Q** All right. And is the very latest date involved, one

17 study that goes through 2014?

18 **A** That sounds right.

19 **Q** Okay. Is it -- would you agree with the general

13:16:33 20 proposition that overdose -- drug overdose death rates have

21 changed significantly over time as drug usage in the U.S.

22 has changed over decades?

23 **A** I'm sorry. Can you say the question again?

24 **Q** Sure. Is it fair to say that rates from the 1980s for

13:16:54 25 overdose death rates would be much different because the

1 drugs used in the 1980s were different than the drugs used  
2 today, for example, fentanyl?

3 **A** So the change after fentanyl is why we did -- why I  
4 did the weighted average. In terms of drug poisoning rates  
13:17:15 5 in the 1980s, drug poisoning rates were relatively stable  
6 until the increase due to prescription opioids started.

7 **Q** In about -- well, and were drug rates in the 1980s  
8 consistent with drug rates in the 2010s?

9 **A** Drug rates in 2010 were higher than the 1980s. But  
13:17:38 10 this is why you do a weighted average in the meta-analysis  
11 essentially, is to account for that dynamic.

12 **Q** Now, let's look at the death rate that the Larney  
13 medical analysis -- excuse me -- meta-analysis is reporting  
14 on.

13:17:55 15 You mentioned this morning that the Larney article  
16 title referred to a different overdose death rate than the  
17 OUD overdose death rate.

18 Do you recall that?

19 **A** I'm not understanding the question. A different  
13:18:14 20 overdose death rate?

21 **Q** Well, a different overdose rate. Let's look at  
22 Larney. And maybe I'm asking the question incorrectly.

23 Back to the Larney article.

24 Do you see that?

13:18:34 25 **A** I see the Larney article.

1       **Q**       Okay. And I guess the right way to phrase it,  
2 perhaps, is it looked at a different population. You were  
3 asked about Dr. Kessler's criticism that Larney was  
4 evaluating a different population than those with OUD.

13:18:53 5               Do you recall that general subject?

6       **A**       I recall the subject. The -- I believe that the title  
7 says "using extramedical opioids," but if you look -- what I  
8 had testified earlier, just to summarize, is that if you  
9 look at the populations in the OUD calculation, the people  
13:19:10 10 have OUD.

11       **Q**       Well, we'll get to that. But first, let's go one step  
12 at a time.

13               People -- you'll agree with me that people using  
14 extramedical opioids as a category is not the same as people  
13:19:26 15 with OUD. Those don't describe the same populations, those  
16 two terms?

17       **A**       People with OUD would be a subset of people using  
18 opioids extramedically.

19       **Q**       Right. Extramedically is a broader population than  
13:19:42 20 OUD, fair?

21       **A**       In many cases I would say.

22       **Q**       Okay. Now, you said, I think, that Dr. Kessler must  
23 have just looked at the title here, and he's confused if he  
24 thinks that this article is focused on people using  
13:20:02 25 extramedical opioids.

1 Do you remember that testimony?

2 **A** Well, I said that the title says "using extra medical  
3 opioids," but that I didn't rely on the title for my  
4 calculation.

13:20:12 5 **Q** But do you remember saying Dr. Kessler might have just  
6 looked at the title? Do you recall --

7 **A** Yeah, I don't know what Dr. Kessler looked at, but if  
8 he looked at the title only, it would say "extramedical  
9 opioids."

13:20:24 10 **Q** With respect, I know you don't know what Dr. Kessler  
11 looked at. My question is, do you recall saying this  
12 morning he must have just looked at the title?

13 **A** I think I said something to -- in that ballpark.

14 **Q** Right.

13:20:37 15 **A** I don't know if I said --

16 **Q** Why don't we look at some other portions of this  
17 article that perhaps Dr. Kessler also looked at.

18 Do you see the objective underneath the title here on  
19 the first page?

13:20:49 20 **A** Yes.

21 **Q** Okay. And the objective that Dr. Larney describes in  
22 her meta-analysis is to estimate all cause and  
23 cause-specific crude mortality rates and standardized  
24 mortality rates among people using extramedical opioids,  
13:21:05 25 that broader population.

1 That's what the objectives of her article says, right?

2 **A** Yes.

3 **Q** All right. Now, let's also look at the next page of  
4 her article.

13:21:27 5 Do you see that page before you on the screen,  
6 Dr. Keyes?

7 **A** Yes.

8 **Q** And Dr. Larney in her meta-analysis has an inclusion  
9 and exclusion criteria.

13:21:43 10 Do you see that?

11 **A** Yes.

12 **Q** And do you see, I think it's the third sentence, where  
13 she says in her meta-analysis: Cohorts did not need to be  
14 opioid-dependent or have opioid use disorder to be included.

13:22:02 15 That's what Dr. Larney said in her article, right?

16 **A** That applies broadly to the whole analysis, not the  
17 analysis that I did.

18 **Q** Okay.

19 **A** So that's --

13:22:12 20 **Q** Well, I'm not asking about the analysis you did right  
21 now. I'm asking about Dr. Larney's description of the  
22 analysis.

23 **A** It's just not relevant.

24 **Q** Sorry. We need -- I need to finish before you go  
13:22:21 25 ahead.

1       **A**       Okay.

2       **Q**       And I'm not asking also whether you agree it's  
3       relevant or not.

4               I'm asking you: In her article, Dr. Larney's  
13:22:31 5       meta-analysis, did she describe it as involving cohorts that  
6       did not need to be opioid-dependent or have opioid use  
7       disorder to be included?

8               Is that how she described it?

9       **A**       For the analysis that's not the one I included, yes.

13:22:55 10      **Q**       So if we look at the .0052 from Dr. Larney's  
11      meta-analysis that you used as the first step in the  
12      denominator, and then tripled as the second step, it was not  
13      involving populations in 2019, was it?

14      **A**       Say that again.

13:23:17 15      **Q**       It did not involve any populations in 2019, did it?

16      **A**       It did because, again, it's a weighted rate that  
17      includes the data from 2019 from the CDC WONDER.

18      **Q**       The populations in the cohorts, the 56 cohorts that  
19      Dr. Larney examined, the ones you told me the latest date  
13:23:40 20      for the U.S. was 2014, none of those populations involved  
21      2019 populations. The studies were all done before, were  
22      they not?

23      **A**       The denominator has four numbers. You're talking  
24      about one of the numbers. That included data up through  
13:23:57 25      2014. And then the other numbers included data from 2019.



1       **Q**       The -- Dr. Larney's meta-analysis did not involve  
2       populations for Lake County or Trumbull County or Ohio, did  
3       they?

4       **A**       Those data were included in some of the studies from  
13:24:18 5       the U.S., but none of the studies exclusively focused on  
6       Lake and Trumbull. The analysis does because the numerator  
7       is from Lake and Trumbull.

8       **Q**       Well, when you talk about the analysis, you're talking  
9       about your formula here?

13:24:32 10      **A**       Right.

11      **Q**       Yeah.

12               And I'm going back, again, to Dr. Larney's  
13       meta-analysis for a minute.

14               And her meta-analysis is not based on studies in Lake  
13:24:45 15       County or Trumbull County or even Ohio, is it?

16      **A**       Like I mentioned, Ohio is included in the U.S. data,  
17       but none of the studies exclusively focus on Ohio data.

18      **Q**       And that's some of the seven out of the 56?

19      **A**       Yes.

13:25:01 20      **Q**       Okay. Now, let's look at your tripling of the Larney  
21       rate, as this -- the second step or at least the second rate  
22       that you used in the denominator. Okay?

23      **A**       Okay.

24      **Q**       Now, you said -- I think you said you decided to  
13:25:22 25       triple the Larney rate to account for the increased death

1 rate for synthetic opioids from 2011 to '15; is that  
2 accurate?

3 **A** I wouldn't say I decided. I did a statistical  
4 analysis that showed that a three-time multiplied prior rate  
13:25:47 5 to that rate is rigorous.

6 **Q** Okay. But I have the tripling part right, and it's to  
7 account for an increased death rate with respect to heroin  
8 and fentanyl, or is it just fentanyl?

9 **A** To account for the introduction of synthetic opioids,  
13:26:07 10 including fentanyl, into the drug supply.

11 **Q** I didn't hear the last part.

12 **A** To account for the introduction of synthetic opioids,  
13 including fentanyl, into the drug supply.

14 **Q** Okay. And you -- your analysis said that from 2011 to  
13:26:25 15 2015 the death rate approximately tripled?

16 **A** That's right.

17 **Q** And that's your rationale for tripling here?

18 **A** Well, that's part of the rationale. It's called an  
19 interrupted time series approach. And I can go through that  
13:26:42 20 in more detail in terms of how epidemiologists do those  
21 types of analyses if that would be helpful.

22 **Q** Do you agree that the death rate for synthetic opioids  
23 has continued to increase after 2015?

24 **A** Yes, I do. And that's exactly why we do the weighting  
13:26:57 25 of the synthetic to nonsynthetic deaths to account for the

1 continued increases after 2015.

2 **Q** And the continued increase you're describing is shown  
3 by one of the charts in your report, I believe. If we look  
4 at figure six, for example, which shows the number of  
13:27:32 5 overdose deaths, including opioids, in Ohio.

6 And does this chart show that after 2015 the fentanyl  
7 and synthetic opioids rate in the yellow, I guess it is  
8 here, more than doubled by 2017?

9 **A** Well, we can be even more specific. I mean, from 2015  
13:27:55 10 to 2018, as the multiplier method takes account of, the  
11 proportion of deaths in Ohio that involved synthetic opioids  
12 increased from 37 percent of deaths to 70 percent of deaths,  
13 which is why that denominator changes for the OUD  
14 calculation across that time.

13:28:14 15 **Q** It changes because you tripled it based on the 2011 to  
16 2015 increase?

17 **A** No. So it changes because, see, in the -- the  
18 demonstrative that you did, you have 22 percent and  
19 78 percent. Those are the proportion of synthetic opioid  
13:28:33 20 deaths in 2019 in Lake County. In 2015 in Lake County, the  
21 proportion of drug overdose deaths that involved synthetic  
22 opioids was 38 percent. So that -- those numbers would have  
23 been 38 and 62 percent, so that you're always accounting for  
24 the increase in synthetic opioid deaths in the counties. It  
13:28:56 25 doesn't have to do with the tripling.

1 Q Do you agree that since 2013, about that time period,  
2 overdose deaths due to synthetic opioids, including  
3 fentanyl, have been exponentially increasing?

4 A Yes. That's why the method accounts for it.

13:29:16 5 Q Now, am I right that if you used a higher rate in the  
6 denominator in your formula, your estimate of the population  
7 of those with OUD would have been lower?

8 A Well, any time you change a formula on one side of the  
9 equation, the other side of the equation is going to change.

13:29:46 10 Q Right. And I'm asking about the direction of the  
11 change.

12 A Right. Yes.

13 Q So if the denominator -- I'm sorry. Just let me  
14 finish for the reporter, and then I'll let you finish.

13:29:55 15 If the denominator, if that death rate goes up, the  
16 estimate of the population with OUD goes down. That's the  
17 math, right?

18 A That's the math.

19 Q Let me move to a different subject.

13:30:13 20 Going back to the first board, at least the concept of  
21 it, and this was -- can you see it, Dr. Keyes? This was  
22 Demo 32, and this was the one we titled or I titled  
23 Dr. Keyes' Estimates Opioid Mortality 2015 to '19, in which  
24 you made a count of what you described as the opioid deaths  
13:30:46 25 directly attributable to prescription opioids and those

1 indirectly attributable to prescription opioids, correct?

2 **A** Yes.

3 **Q** All right. Now, with respect to your OUD population  
4 estimates, the 5,934 and 7,560 for Lake and Trumbull County  
13:31:07 5 in 2019, at least in concept, did you do some kind of  
6 evaluation of the members of these populations who had OUD  
7 directly or indirectly attributable to prescription opioids  
8 as you see it?

9 **A** Yes.

13:31:29 10 **Q** Okay. And, in fact -- I'm not going to burden the  
11 record with more math, at least that's not my plan right  
12 now, but is it fair to say that the attribution you did  
13 showed that, according to your calculation, the population  
14 of people who had OUD in Lake County and Trumbull County in  
13:31:54 15 2019 that was directly or indirectly attributable to  
16 prescription opioids, as you account for those categories,  
17 was lower than these numbers somewhat than the 5,934 and  
18 7,560 shown on Demo 34?

19 **A** Those estimates, yes. They are in figure 13, if you  
13:32:19 20 want to pull that up.

21 **Q** Okay. I'm tired. I'm getting tired of math myself,  
22 but I just --

23 **A** This is --

24 **Q** The concept is --

13:32:28 25 **A** I like the math.

1 Q You're just getting started.

2 A I know.

3 Q But in any event, you did categorize them and the  
4 total of direct and indirect attribution to prescription  
13:32:40 5 opioids was populations somewhat less than these two  
6 figures, 5,934 and 7,560, for Lake and Trumbull in 2019?

7 A Yes.

8 Q Okay. Do you know whether Dr. Alexander used any  
9 adjustment for the OUD populations as his input into his  
13:33:01 10 model in which he estimates and projects OUD populations and  
11 treatments and services? Do you know if he made any  
12 adjustment like you did? Or did he use these kind of top  
13 line numbers, 5,934 and 7,560, in his model? Do you know?

14 A From what I have seen of his model, he used,  
13:33:20 15 appropriately, the total number of people with OUD.

16 MR. HALL: I'll pass the witness, Your Honor.

17 THE COURT: Okay.

18 MR. HYNES: Your Honor, Paul Hynes from CVS.

19 Can we have a few minutes to get set up and take the boards  
13:33:39 20 down and make sure that we're --

21 THE COURT: All right.

22 (Pause in Proceedings)

23 THE COURT: I take it that was the only  
24 defense counsel that was going to question Dr. Keyes.

13:34:20 25 MR. HYNES: No. I'm a defense counsel.

1 THE COURT: Okay.

2 **CROSS-EXAMINATION OF KATHERINE KEYES**

3 **BY MR. HYNES:**

4 **Q** Good afternoon, Dr. Keyes.

13:34:42 5 **A** Good afternoon.

6 **Q** My name is Paul Hynes. We haven't met. I represent  
7 CVS.

8 How are you doing?

9 **A** I'm doing well.

13:34:48 10 **Q** Good.

11 **A** Thank you.

12 **Q** Good.

13 I just have some follow-up questions from Mr. Hall's  
14 examination.

13:34:53 15 **A** Okay.

16 **Q** First of all, I want to start on the surveys. I went  
17 to the University of Michigan. So did other lawyers in this  
18 courtroom, including Mr. Hall, my colleague Ms. Miller, and  
19 even Special Master Cohen. We all went to U of M. We were  
13:35:08 20 very happy last November, weren't we, when we beat Ohio  
21 State.

22 **A** Ann Arbor is lovely.

23 **Q** It is. And I saw you taught there.

24 **A** Really? Oh.

13:35:22 25 **Q** Well, your resume says you were an adjunct professor,

1 an adjunct research assistant professor at the University of  
2 Michigan.

3 **A** That's right.

4 **Q** That's right? Okay.

13:35:28 5 And you were a professor in --

6 **A** Oh. I thought you said, "I saw you talk there." I'm  
7 sorry. I didn't under -- I was like, really? Thank you.

8 **Q** No, you wouldn't find me at a talk that you would do.  
9 No offense. I just --

13:35:35 10 **A** Okay. Sorry. I just misunderstood the question.

11 It's hard to hear a little bit. I don't know if you can  
12 come a little closer.

13 **Q** Is that better?

14 **A** That's better.

13:35:42 15 **Q** Okay. No, no offense. I just -- this is -- this is  
16 complicated stuff.

17 You were a professor in University of Michigan's  
18 survey research center, correct?

19 **A** That's right.

13:35:52 20 **Q** Okay. And you did that for five years?

21 **A** Yes.

22 **Q** About 2015 to 2020?

23 **A** That sounds about right.

24 **Q** Okay. And so, I think as you told Mr. Hall, you have  
13:36:01 25 been involved in conducting surveys?



1       **A**       Yes.

2       **Q**       Okay. And you've actually done at least one survey in  
3       Ohio; is that right?

4       **A**       I'm not sure. I mean, we do -- I do -- I'm involved  
13:36:16 5       in national surveys, so we collect data in Ohio every year.

6       **Q**       Let me try. I saw -- I read in the *American Journal*  
7       *of Epidemiology*, April 2016 --

8                       (Court Reporter interjection)

9                       THE COURT: Mr. Hynes, you're going way too  
10       fast.

11                      MR. HYNES: Sorry.

12       **BY MR. HYNES:**

13       **Q**       I saw an article in the *American Journal of*  
14       *Epidemiology*, dated April 2016, about alcohol use in  
13:36:37 15       military cohorts.

16       **A**       Yes.

17       **Q**       Yes. And you --

18       **A**       I wasn't involved in the data collection of that  
19       survey. I was involved in the data analysis.

13:36:46 20       **Q**       Okay. You were an author of that paper?

21       **A**       Yes. But I -- yes.

22       **Q**       Okay. And recently, I think in 2021, you coauthored  
23       two papers that conducted surveys in Afghanistan; is that  
24       right?

13:37:01 25       **A**       Yes.

1 Q Okay. And those surveys were actually household  
2 surveys done in Afghanistan?

3 A Yes.

4 Q Okay. And I believe they covered about 16 of the  
13:37:13 5 country's 34 provinces. Does that sound right?

6 A Yes.

7 Q Okay. In this case, back to Lake and Trumbull  
8 Counties, you're estimating the OUD populations in the  
9 counties, right?

13:37:26 10 A Yes.

11 Q Okay. But you did not, as you told Mr. Hall, conduct  
12 any surveys in the counties?

13 A No.

14 Q You didn't interview any people in the counties?

13:37:39 15 A I interviewed people who work in public health in the  
16 counties, as is documented in this report.

17 Q Fair enough. Like Ms. Fraser?

18 A Yes.

19 Q You didn't interview anyone with OUD?

13:37:54 20 A I've spoken to people with OUD in Ohio, although I  
21 don't think they were in Lake or Trumbull County. But I did  
22 not for my OUD calculation. That would not be relevant.

23 Q That would not be relevant, okay.

24 Just to be clear, you did not talk to any OUD patients  
13:38:10 25 in Lake and Trumbull Counties?

1       **A**       That's right. Not as far as I know.

2       **Q**       Okay. You did not conduct any focus groups in Lake  
3       and Trumbull Counties?

4       **A**       No.

13:38:19 5       **Q**       Now, in preparing your report, you considered a lot of  
6       materials, didn't you?

7       **A**       I did.

8       **Q**       I looked at your reliance list. I counted over 1,700  
9       documents. Does that sound about right?

13:38:31 10       **A**       That sounds about right.

11       **Q**       Okay. And including documents produced by the City of  
12       Huntington, West Virginia?

13       **A**       Yes.

14       **Q**       And I think over 300 documents produced by Suffolk  
13:38:43 15       County, New York?

16       **A**       Yes.

17       **Q**       Okay. But you did not consider the treatment data  
18       that the Lake County ADAMHS Board or the Trumbull County  
19       Mental Health and Recovery Board produced in this case?

13:38:55 20       **A**       Well, I considered it, but when you -- this is  
21       actually kind of a classic issue in psychiatric  
22       epidemiology, that when you rely on only people who receive  
23       treatment, you miss a lot of people who don't receive  
24       treatment. And for something like substance use disorder,  
13:39:14 25       only a small proportion of people who have the disorder

1 receive treatment, so you can't get an estimate of  
2 prevalence from treatment records.

3 **Q** So your testimony under oath is you considered the  
4 treatment data?

13:39:26 5 **A** I -- when -- when -- I guess my testimony would be  
6 that when I was arriving at a method for estimating OUD, I  
7 went through, should we rely on survey data? Should we look  
8 at treatment data? Should we -- you know, what are the  
9 different potential sources of data?

13:39:46 10 And in considering each one and weighing the pros and  
11 cons of each one, I came to the conclusion that those data  
12 sources would not provide me with an accurate estimate of  
13 the number of people with OUD.

14 **Q** So you did not review, you did not look at the  
13:40:02 15 treatment data?

16 **A** I don't -- I only looked at the publicly available  
17 data sources to document burden.

18 **Q** Okay.

19 **A** So I guess I'm thinking more theoretically, like,  
13:40:14 20 would you want to look at treatment data, what would be the  
21 pros of that, what would be the cons of that, but I didn't  
22 review any specific treatment records for my opinions.

23 **Q** And to be clear for the record, the treatment data is  
24 not identified in your reliance materials?

13:40:27 25 **A** That sounds about right.

1 Q Okay. You can't name a single person in the counties  
2 that has OUD, can you?

3 A I did not meet with anyone who specifically had OUD in  
4 these counties.

13:40:40 5 Q So the people that make up your estimate of the OUD  
6 population, those people are completely unknown to you?

7 A That's right.

8 Q Okay. You have absolutely no idea who they are?

9 A I didn't -- I didn't do any interviews with people  
13:40:57 10 with OUD in Lake and Trumbull, so I have not -- I've spoken  
11 to a lot of people with OUD over the years but not for this  
12 specific report.

13 Q And so you don't know who the people are that have  
14 OUD?

13:41:09 15 A I don't know people with OUD in Lake and Trumbull  
16 County.

17 Q Okay. Let's turn to your multiplier. I know you  
18 spent a lot of time with Mr. Hall going over it. I'm not  
19 going to get into the nitty-gritty. Okay? I'm not sure I  
13:41:21 20 know what a numerator is, so we're going to stay high level.

21 But just on a 30,000-foot level, you used a multiplier  
22 method to estimate the OUD population in the counties,  
23 correct?

24 A Yes.

13:41:33 25 Q Okay. And you took that multiplier and you applied it

1 to the number of overdose deaths in the counties in 2019  
2 based on this CDC WONDER data to derive an estimated OUD  
3 population, fair?

4 **A** Fair.

13:41:52 5 **Q** Okay. And just so Your Honor understands, the lower  
6 the multiplier, the larger the OUD population you will  
7 derive?

8 **A** Yep. That's -- I mean, if you lowered it, the number  
9 goes up. If you use a higher number, the number goes down.  
13:42:10 10 That's just how denominators work.

11 **Q** That was my next question. The larger it is, the  
12 lower your population is?

13 **A** Right.

14 **Q** Right. Okay.

13:42:18 15 And you are using a multiplier, as you told Mr. Hall,  
16 of 0.52?

17 **A** No. I mean, we can pull -- there's four different  
18 numbers on the board.

19 **Q** Right.

13:42:30 20 **A** So it's .0052 weighted by the proportion of people --  
21 proportion of drug overdose deaths that involve synthetic  
22 opioids, so it's not .0052 alone.

23 **Q** Fair enough. And I apologize. I'm taking this in  
24 steps. Let's put aside the illicit fentanyl adjustment and  
13:43:00 25 talk about the first part of the equation.

1           You take the top number and you divide it by .0052,  
2       correct?

3       **A**     Well, no. That's not -- but I know what you're  
4       saying. I just want to be very accurate for the record  
13:43:17 5       that --

6       **Q**     Okay.

7       **A**     -- you start there and then you adjust it for  
8       synthetic opioids.

9       **Q**     Right. Fair enough.

13:43:22 10       Okay. And you described this multiplier, this 0.52  
11       multiplier, in that April 2022 paper that you published that  
12       Mr. Hall asked you about, right?

13       **A**     Yes.

14       **Q**     Okay. And that paper is in a journal called *Drug and*  
13:43:49 15       *Alcohol Dependence Reports*?

16       **A**     Yes.

17       **Q**     Okay. And you're the lead author of it?

18       **A**     Yes.

19       **Q**     Okay. Okay. And you previously, before writing that  
13:44:01 20       paper, used that multiplier in expert reports in two cases,  
21       first in the Track Two cases which are the West Virginia  
22       cases, and then in these cases, correct?

23       **A**     I've used that same approach in all the cases that  
24       I've worked on.

13:44:16 25       **Q**     Right. And we'll get to that.

1 Did you communicate with any of the plaintiffs'  
2 lawyers, either the ones here or the ones representing other  
3 plaintiffs in the opioids cases, did you communicate with  
4 any of them about the paper that you published last month?

13:44:32 5 **A** I sent it to them after it was published.

6 **Q** But no communications before it was published?

7 **A** We've had discussions, you know, when preparing my  
8 reports about specific jurisdictions, but not about the  
9 science, I guess.

13:44:46 10 **Q** Okay. And give me one second. I'm just going to grab  
11 the paper. Okay?

12 **A** Okay.

13 MR. HYNES: Your Honor, may I approach?

14 THE COURT: Yes.

13:45:31 15 **BY MR. HYNES:**

16 **Q** Is this the paper, Ms. Keyes -- Dr. Keyes?

17 **A** Yes.

18 **Q** Okay.

19 MR. HYNES: Mr. Pitts, may I have the ELMO?

13:46:05 20 **BY MR. HYNES:**

21 **Q** Dr. Keyes, I'm going to turn to page five. This is  
22 the declaration of competing interests?

23 Do you see that section?

24 **A** I do.

13:46:21 25 **Q** And that's a -- that's a typical section in a paper in



1 a journal that you would publish in, right?

2 **A** Yes.

3 **Q** Okay. And you say: KMK and CR have been compensated  
4 for expert witness work in litigation.

13:46:38 5 **A** Yes.

6 **Q** All right. And KMK is you?

7 **A** Yes.

8 **Q** Okay. And you don't identify the litigation?

9 **A** No.

13:46:47 10 **Q** Okay. Or the subject matter of it?

11 **A** No.

12 **Q** Or what side of it you're on?

13 **A** No. I just disclose that I was compensated for expert  
14 witness work in litigation.

13:47:01 15 **Q** Okay. And up above: Role of funding source, nothing  
16 declared.

17 Do you see that?

18 **A** I do.

19 **Q** Okay. And you said you used this multiplier in all  
13:47:17 20 your opioid cases?

21 **A** Yes. And I've used it before opioid cases as well. I  
22 mean, it's a classic epi method. I've used it for years.

23 **Q** And you've been compensated by plaintiffs' lawyers in  
24 opioid cases, haven't you?

13:47:34 25 **A** Yes.

1 Q And I think you testified last month in West Virginia.  
2 At that point it was \$300,000.

3 Does that sound right?

4 A Yes.

13:47:41 5 Q That's not disclosed here?

6 A I did not use that funding to write this paper or  
7 to -- this paper is based on the U.S. as a whole. It's not  
8 based on any of the counties or states that I worked with.  
9 There's nothing -- there's no role of the funding source, so  
13:47:58 10 it's accurate.

11 Q Okay.

12 MR. HYNES: Mr. Pitts, I don't need the ELMO  
13 anymore. You can take it down, please.

14 BY MR. HYNES:

13:48:05 15 Q You were an expert witness in the Track One cases in  
16 2019?

17 A Yes.

18 Q Okay. And also an expert witness in the New York  
19 cases also in 2019?

13:48:16 20 A Yes.

21 Q And in those cases, you used a different multiplier?

22 A I don't -- oh, is that before the Larney paper was  
23 published?

24 Q I believe you used a multiplier of .65, if that helps  
13:48:29 25 refresh your recollection.

1       **A**       This Larney paper came out in 2019. It was an update  
2       of a previous meta-analysis. So when this paper came out, I  
3       used the most updated data. So yes.

4       **Q**       Okay. And that data resulted in a higher multiplier?

13:48:45 5       **A**       Well, we would need -- it depends on the year, it  
6       depends on the fentanyl correction. We would need to go  
7       back to those reports.

8       **Q**       I don't believe you used a fentanyl correction in New  
9       York in Track One.

13:48:57 10       **A**       I would need to look at the report again. It's been  
11       quite -- quite a while.

12       **Q**       Do you recall using a .65 multiplier in those cases?

13       **A**       I recall that the 2019 paper had not been published  
14       yet, and so I used the previous meta-analysis for that  
13:49:13 15       multiplier estimate. I don't recall. I trust you're  
16       accurately reporting what that multiplier was.

17       **Q**       Okay. And in those cases, you weren't estimating the  
18       OUD population in those jurisdictions, were you?

19       **A**       I thought that I was.

13:49:28 20       **Q**       We can look at your report, but it said: I would  
21       estimate that the total size of dependent or regular users  
22       of opioids.

23       **A**       I would need to look at the report again.

24       **Q**       Okay. We can.

13:50:00 25                               (Pause in Proceedings)

1 THE WITNESS: Thank you.

2 BY MR. HYNES:

3 Q This is your Track One report.

4 A Okay.

13:50:19 5 Q And we'll turn to page 33.

6 And if you go to the -- it's a long report.

7 A I see.

8 Q If you go to the first paragraph that starts in the  
9 middle of the page.

13:50:49 10 MR. HYNES: And, Mr. Pitts, can I have the

11 ELMO back, please?

12 BY MR. HYNES:

13 A Do you have the Degenhardt? It would depend on the  
14 same considerations.

13:51:00 15 In the Larney study I went to the supplemental  
16 materials and figured out what populations were included,  
17 and so, I believe I did the same thing with the Degenhardt  
18 meta-analysis.

19 Q Okay. Let's take a look at it, just that first  
13:51:13 20 sentence.

21 It says: I estimated the population size of  
22 individuals who are dependent or regular users of opioids in  
23 Cuyahoga and Summit Counties by applying the estimated death  
24 rate of 0.65 per 100 person years to the number of overdose  
13:51:30 25 deaths.

1 Do you see that?

2 **A** I do.

3 **Q** Does that refresh your recollection that you used  
4 a .65 multiplier?

13:51:37 5 **A** It does.

6 **Q** Okay. And does that refresh your recollection that  
7 you were estimating not the OUD population but individuals  
8 who were dependent or regular users of opioids?

9 **A** Yes.

13:51:49 10 **Q** Okay. And I believe you said earlier in response to  
11 one of Mr. Hall's questions that the OUD population is a  
12 subset of folks who are regular or dependent users of  
13 opioids?

14 **A** No. The testimony that I gave earlier was that OUD --  
13:52:19 15 the OUD population is a subset of extramedical users.  
16 Dependent -- dependent users are people with OUD. Regular  
17 users, the vast majority of them will have OUD as well.

18 **Q** It's still a subset though, isn't it?

19 **A** The testimony that I gave earlier is that people with  
13:52:40 20 OUD include -- are a part of people who use opioids  
21 extramedically. Dependent or regular users of opioids would  
22 be people with OUD. You could have a regular user of  
23 opioids who doesn't have OUD, but that would be quite rare.

24 **Q** Okay. So you could have a regular user of opioids who  
13:53:07 25 does not have OUD?

1       **A**       Yes. It's possible.

2       **Q**       Okay. So in this report, you were estimating a  
3 broader population than you're estimating in this case?

4       **A**       I would say that that's largely semantic. Dependent  
13:53:25 5 or regular users of opioids would have OUD. Well, dependent  
6 users of opioids have OUD. Regular users of opioids by and  
7 large have OUD.

8       **Q**       Wouldn't this include a person who was prescribed  
9 opioids on a regular basis and uses them in accordance with  
13:53:45 10 his or her doctor's directions?

11       **A**       I would need to again go to the Degenhardt  
12 supplemental figure and see what populations were included  
13 in that. I don't -- this was a couple years ago now, so I  
14 don't remember exactly what studies were included in their  
13:53:57 15 calculation for OUD death rates.

16       **Q**       We don't have that study here.

17               So for clarity of the record, your testimony today is  
18 that all people who are dependent or regular users of  
19 opioids have OUD?

13:54:12 20       **A**       That's my -- my testimony is that people who are  
21 dependent on opioids have OUD. And that most people who use  
22 opioids regularly have -- likely have OUD as well. But I  
23 would need to go to the Degenhardt supplemental figure to  
24 see exactly which populations were included in that.

13:54:30 25       **Q**       Okay. You said "mostly," so I'm going to ask the

1 question again.

2 It says regular users of opioids. I'll put aside  
3 dependent users of opioids.

13:54:42

4 Your testimony is that regular users of opioids, all  
5 regular users of opioids have OUD?

6 **A** What I just said was that I'm not saying that.

7 **Q** Okay. So this -- this estimate in this case which  
8 used a .65 multiplier estimated a population that included  
9 individuals who did not have OUD?

13:55:05

10 **A** I'm not sure. I have to go back to the Degenhardt  
11 article to look at that in more detail. I'm -- it was a  
12 couple years ago now.

13 **Q** You gave a deposition in the Track One cases, right?

14 **A** Yes.

13:55:32

15 **Q** That was back in April of 2019.

16 Do you remember that?

17 **A** I remember, because it was the first time I was ever  
18 deposed. It was a memorable experience.

19 **Q** Yeah, I was going to say it feels like a long time  
20 ago, doesn't it?

13:55:44

21 **A** It does.

22 **Q** Yeah. Before COVID.

23 You testified at that deposition that your Track One  
24 report, which we just looked at, did not cite anyone who had  
25 previously used a multiplier methodology to estimate an OUD

13:55:53

1 population.

2 **A** I don't remember my Track One deposition testimony.

3 **Q** Okay.

4 **A** But I'm sure you have it, so we could just look at it.

13:56:08 5 **Q** Well, let me ask you this: Does your Track Three  
6 report cite anyone who has used a multiplier methodology to  
7 estimate an OUD population?

8 **A** Yes. The Barocas study.

9 **Q** And tell us about that study.

13:56:22 10 **A** So this is a, what's called a capture-recapture study,  
11 which is another commonly used epidemiological method for an  
12 unknown population size.

13 And Barocas used a capture-recapture methodology to  
14 estimate OUD population size in Massachusetts and  
13:56:43 15 essentially showed in that paper that the national survey of  
16 drug use and health data underestimated the size of the OUD  
17 population in Massachusetts by a factor of four, so kind of  
18 a multiplier of four.

19 **Q** That paper wasn't using a multiplier to estimate the  
13:57:00 20 OUD population of Massachusetts, was it?

21 **A** Well, it did, in that it said that you have to  
22 multiply the NSDUH data four times to get the OUD  
23 population --

24 (Court Reporter clarification)

25 THE WITNESS: I'm sorry. The NSDUH data,



1 N-S-D-U-H.

2 **BY MR. HYNES:**

3 **Q** You don't cite in your report a paper that uses a  
4 multiplier method with overdose death data to derive an OUD  
13:57:28 5 population?

6 **A** I don't know of a paper that did that, no.

7 **Q** Okay. Well, sitting here today, do you know of a  
8 paper that's done that?

9 **A** I think in my prevalence paper that I published last  
13:57:45 10 month, I do think I -- there are studies that have used the  
11 drug overdose data for multiplier methods. I cite them in  
12 the introduction.

13 **Q** Right. And one of those studies, well, on the second  
14 page, is Mallow. It's page two. It's right here.

13:58:14 15 **A** Estimating the Prevalence of Opioid Use Disorder in  
16 Cincinnati Using Probabilistic Multiplier Methods and Model  
17 Averaging?

18 **Q** Uh-huh.

19 **A** I believe that's one. There might have been others  
13:58:25 20 too.

21 **Q** Have you read that paper?

22 **A** Yes.

23 **Q** Okay. And that was written, the lead author was Peter  
24 Mallow at Xavier University?

13:58:37 25 **A** I -- I don't -- I'm not familiar with him, but I trust

1 that you've identified him --

2 Q Okay.

3 A -- correctly.

4 Q Why don't we pull out that paper.

13:59:15 5 A Thank you.

6 Q Is this the paper that you cited in your recent paper,  
7 Dr. Keyes?

8 A Yes.

9 Q Okay. And this paper was estimating the OUD  
13:59:28 10 population in the Cincinnati, Ohio, core-based statistical  
11 area. Does that sound right?

12 A Yes.

13 Q And that's a 14-county area in Ohio, Indiana, and  
14 Kentucky.

13:59:45 15 Are you familiar with that?

16 A It's been a while since I've read the paper, but I  
17 trust that --

18 Q Okay. Well, you see right up front in the results, it  
19 says the population of that area is 2.1 million people?

13:59:59 20 A I see that.

21 Q Okay. And this paper, if you remember, uses three  
22 different multipliers, correct?

23 A Yes.

24 Q So it uses a multiplier based on treatment admissions,  
14:00:22 25 correct?

1       **A**       Yes.

2       **Q**       Okay. And that's information you might get from  
3 treatment data?

4       **A**       Yes. They used the TEDS data, data that I routinely  
14:00:36 5 work with, so I'm very familiar with it.

6       **Q**       And it used a multiplier based on nonfatal ER overdose  
7 visits, correct?

8       **A**       Yes.

9       **Q**       And then, like you, it used a multiplier based on  
14:00:47 10 overdose deaths?

11       **A**       Yes.

12       **Q**       Yes. Okay. And of those three, let's focus on the  
13 overdose death multiplier, because that's the one you use,  
14 correct?

14:00:57 15       **A**       I believe that their -- they use it slightly  
16 differently. But they also use overdose data.

17       **Q**       Okay. Well, do you recall the multiplier that was  
18 used in this study for overdose deaths?

19       **A**       No.

14:01:16 20       **Q**       Does 7.182 sound correct?

21       **A**       Let's just look at their methodology for a second.

22               So just to take a step back so we're on the same page,  
23 they did a systematic literature review and patient-weighted  
24 pooled analysis to arrive at that multiplier value.

14:01:55 25       **Q**       And they limited themselves to U.S. studies, correct?

1       **A**       I'm just trying to find where they describe the  
2       systematic literature review. Total of ten studies. They  
3       used a Monte Carlo simulation.

4               Yeah, I would need to look into the ten studies. But  
14:02:41 5       there's some combination of ten studies was used.

6       **Q**       Okay. Well, if you look on page -- it's 65, table  
7       two, the multiplier is 7.182.

8               Correct?

9       **A**       I see that value written there.

14:02:59 10      **Q**       Okay. And again, the larger the multiplier, the lower  
11      the OUD population that's derived?

12      **A**       I'm not sure exactly what formula they're using that  
13      multiplier -- how they're arriving at the number of people  
14      with OUD using that multiplier.

14:03:18 15      **Q**       Okay. But you did cite this in your paper last month,  
16      right?

17      **A**       As an example of another study that has used a  
18      multiplier.

19      **Q**       Right.

14:03:27 20      **A**       But it's not -- I'm not sure exactly what they're  
21      doing with that 7.182, because they use a Monte Carlo  
22      simulation, which is a slightly different method. It's kind  
23      of apples to oranges comparison, I guess.

24      **Q**       Okay. But in general, the higher the multiplier, the  
14:03:45 25      lower the OUD population you'll derive?

1       **A**       In my formula, if the denominator gets bigger, the  
2       number goes down. But this 7.182 is not relevant to that  
3       formula.

4       **Q**       So if you look further down on table three.

14:04:25 5       Dr. Keyes, if we look at the previous page, page 64,  
6       there are 996 fatal overdose deaths in this 14-county area  
7       in 2018, which was the year they used, correct?

8       **A**       Yes.

9       **Q**       Okay. And now, if you take that number and you go to  
14:04:56 10      the mean OUD population that they're deriving from that  
11      number -- it's on the next page, in table three -- it's  
12      13,944, correct?

13      **A**       Yes.

14      **Q**       Okay. So using a 7.182 multiplier with 996 overdose  
14:05:19 15      deaths in that 14-county area, this paper derives an OUD  
16      population of 13,944, fair?

17      **A**       Well, multiplying 7.182 by 996 does not get you  
18      13,944.

19      **Q**       Excuse me?

14:05:42 20      **A**       I --

21                   THE COURT: I can see that. And besides, this  
22      says fatal overdose. You're talking about people with  
23      opioid use disorder, Mr. Hynes, so I don't see the relevance  
24      of this at all.

14:05:57 25                   MR. HYNES: Your Honor, her methodology is

1 based on taking fatal overdose --

2 THE COURT: I know. But what you're doing is  
3 just confusing me as well as the witness.

4 MR. HYNES: Let me try again.

14:06:08 5 THE COURT: All right.

6 MR. HYNES: She's using a methodology where  
7 she takes fatal overdose deaths --

8 THE COURT: I understand that. But I can see  
9 this table. It says fatal overdose, and 13,944, and you're  
14:06:21 10 asking her doesn't this show opioid use disorder population.  
11 So it -- it's -- it doesn't because it's something totally  
12 different.

13 **BY MR. HYNES:**

14 **Q** Dr. Keyes, in this case, for the two counties with  
14:06:43 15 overdose deaths of about less than 200, you are estimating  
16 an OUD population of 13,494, correct, or around there?

17 **A** I'm sorry. Can you ask that question again?

18 **Q** Yes. In this case, for the two counties, based on  
19 overdose deaths of less than 200, using your multiplier and  
14:07:10 20 your illicit fentanyl adjustment, you are estimating an OUD  
21 population of just over 13,000?

22 **A** When the two counties are combined?

23 **Q** Yes.

24 **A** Yes.

14:07:25 25 **Q** Yes.

1 And this study, if you just go to the first page, it's  
2 estimating 15,000 individuals with OUD in that 14-county  
3 area around Cincinnati, the study that you cited in your  
4 paper?

14:08:01 5 **A** I'm sorry. This is apples to oranges. You need -- if  
6 you're trying to compare my results to this paper, you need  
7 the total population size of the counties. You're --

8 **Q** The total population size -- well, that's 2.1 million.

9 **A** Right. But you're comparing that to my calculation.  
14:08:21 10 They're totally different methodologies. So I don't --  
11 I'm -- I'm confused as to how these comparisons -- I don't  
12 think these are directly comparable is what I'm saying.

13 **Q** You would agree that the multiplier used here is  
14 higher than the multiplier you used?

14:08:35 15 **A** No, I'm saying you can't compare them because they're  
16 used in different ways. That seven -- the 7.182 is not  
17 divided by the total number of drug overdose deaths.  
18 They're totally different ways of approaching the issue.

19 **Q** Okay. This paper does say there are 996 overdose  
14:08:59 20 deaths in 2018 in that 14-county area.

21 **A** Yes. 996 fatal overdoses in the Cincinnati MSA.

22 **Q** Okay. And it is estimating, back to the first page in  
23 the results section, 15,000 individuals with OUD?

24 **A** Yes.

14:09:26 25 **Q** Okay. If we were to apply your multiplier to 996

1 fatal overdose deaths, we would get a much larger OUD  
2 population, wouldn't we?

3 **A** Well, you can't just directly apply it. You'd have to  
4 do the adjustments for fentanyl and other -- other -- I  
14:09:48 5 don't know how many, what proportion of overdose of those  
6 996 overdose deaths are synthetic versus nonsynthetic.

7 **Q** Your -- in this case, you were dealing with less than  
8 200 overdose deaths, right?

9 **A** Yes.

14:10:02 10 **Q** Okay. And you derived an OUD population of 13,000,  
11 just over 13,000, for the two counties?

12 **A** Yes.

13 **Q** And that is roughly comparable to the OUD population  
14 that is estimated in this paper?

14:10:14 15 **A** No.

16 **Q** Okay. It's -- the one in this paper is 2,000 greater,  
17 it's 15,000 people?

18 **A** Right.

19 **Q** Okay. And down below, it says that the prevalence of  
14:10:27 20 OUD estimated to be in these 14 counties is .62 percent of  
21 the population?

22 **A** Okay.

23 **Q** That's much lower than the prevalence that you  
24 estimate in Lake and Trumbull Counties?

14:10:40 25 **A** I estimate that the prevalence of OUD in Lake and



1 Trumbull Counties I think is between three and four percent.

2 Q Correct. So this one is much lower?

3 A They're totally different methods, so I don't think  
4 you can directly compare them.

14:10:58 5 MR. HYNES: Mr. Pitts, you can take the ELMO  
6 down.

7 BY MR. HYNES:

8 Q Switching gears, Dr. Keyes.

9 You know Dr. Alexander, don't you?

14:11:07 10 A I've met Dr. Alexander.

11 Q You know who he is?

12 A I know who he is.

13 Q Okay. And you know he's one of the plaintiffs'  
14 experts in this case?

14:11:14 15 A I do.

16 Q Okay. And you know he's testifying not next but, you  
17 know, in two days, roughly?

18 A I wasn't aware of that.

19 Q Okay. Are you familiar with his APOLLO model?

14:11:28 20 A I'm generally familiar. I've read his studies in the  
21 peer-reviewed literature, and I've reviewed his report for  
22 this case.

23 Q Okay. So you're aware that it uses the NSDUH data to  
24 estimate OUD populations?

14:11:47 25 A I've seen -- I've seen studies that he's published

1 that have used the NSDUH data for OUD population.

2 Q Okay. And that's not a methodology that you use?

3 A Correct.

4 Q Okay. And in his September 2021 paper, which I think  
14:12:07 5 is the one that you might be referring to, he estimates the  
6 national OUD population to be about two and a half million.  
7 Does that sound right? About what he says, not what you  
8 think.

9 A Do you have the study? I'd like to just see it before  
14:12:22 10 I confirm what he wrote. Thank you.

11 Q Have you looked at this study, Dr. Keyes?

12 A I have read this study, yes.

13 Q And you're familiar with this study?

14 A I'm familiar with it.

14:12:59 15 Q Okay. And right here: Of the 2.4 million individuals  
16 in the United States with estimated active OUD in 2019.

17 Do you see that?

18 A Yes, I do.

19 Q Okay. I believe we saw a chart when Mr. Hall was  
14:13:18 20 examining you that showed your estimate in your report in  
21 this case of the OUD population in the United States?

22 A Yes. And it's also in the paper that I published --

23 Q Right.

24 A -- that we've already looked at.

14:13:32 25 Q And it's higher than this, isn't it?

1       **A**       Yes.

2       **Q**       It's about 7 million?

3       **A**       Yes.

4       **Q**       Okay. Let's go back to your paper last month. And

14:14:01 5       let's turn to page five.

6               Page five discusses the limitations to your

7       methodology, correct?

8       **A**       Yes.

9       **Q**       Okay. One of those limitations that's explained here

14:14:18 10       is that the methodology includes multipliers that are

11       subject to assumptions.

12       **A**       Yes.

13       **Q**       Is that a correct limitation?

14       **A**       Yes.

14:14:26 15       **Q**       Okay. Another one is that: For the multiplier used

16       in the death data, we relied on a meta-analysis that

17       included a range of countries, time periods, and underlying

18       populations. While this is a strength, given that the

19       meta-analysis is thus an average of a wide range of studies,

14:14:49 20       it assumes that the meta-analysis -- meta-analytic estimate

21       accurately captures the mortality rates in the U.S. OUD

22       population.

23               Is that another limitation?

24       **A**       Yes.

14:15:02 25       **Q**       Okay. Another one discussed is that: The correction

1 to the multiplier to account for increased lethality in  
2 recent years is also subject to assumptions. Additional  
3 surveillance of the OUD population in the U.S. is critical  
4 to improving assessment of drug lethality.

14:15:21 5 Is that another limitation?

6 **A** Yes.

7 **Q** And those limitations apply to this paper and also to  
8 the methodology that's laid out in your report in this case,  
9 fair?

14:15:35 10 **A** Yes.

11 **Q** Thank you.

12 The multiplier that you use is not based on a single  
13 study that looked at overdose rates in 2021, cohorts in  
14 2021?

14:16:01 15 **A** I only went up through 2020 in the report because 2021  
16 data weren't available.

17 **Q** That was a bad question.

18 The Larney study, the Larney study that your .52  
19 multiplier is based on, you know what I'm talking about?

14:16:18 20 **A** Yes.

21 **Q** Yeah.

22 The Larney study that derives the 0.52 multiplier is  
23 not based on any cohort from the past two or three years?

24 **A** Right, which is why I made the adjustments that I did.

14:16:35 25 **Q** Right. But it's not based on any cohort in the past

1 two or three years?

2 **A** The Larney meta-analysis for that supplemental figure  
3 did not include data for the past several years, which is  
4 why I adjusted my estimate.

14:16:49 5 **Q** I believe the last cohort went up to 2014 or '15; is  
6 that correct?

7 **A** I believe that's U.S. cohorts.

8 **Q** Okay.

9 **A** I need -- I'm not sure about every cohort that's  
14:16:59 10 included in those 56. I think there were some that actually  
11 went further --

12 **Q** Okay.

13 **A** -- in time.

14 **Q** But because of that, and I think you just said, you  
14:17:07 15 created the illicit fentanyl adjustment to deal with that, I  
16 guess, limitation?

17 **A** Yes.

18 **Q** You don't cite a single study that has used that  
19 fentanyl adjustment in your report or in your paper?

14:17:28 20 **A** That's right.

21 **Q** And you're not aware of that adjustment being done  
22 outside of this case?

23 **A** I did it in the paper that I published.

24 **Q** Fair enough.

14:17:41 25 Besides your paper, you're not aware of it being done

1 outside this case?

2 **A** Well, the paper is outside of the case. But besides  
3 my paper and the peer-reviewed literature, I haven't seen  
4 others use it. Although I know some people are using it for  
14:17:55 5 ongoing work, but I can't point to peer-reviewed studies  
6 yet.

7 **Q** One of the -- one of the papers on the illicit  
8 fentanyl and the rise in illicit fentanyl overdoses, one of  
9 the papers on that that you cite in your April 2022 paper is  
14:18:14 10 the Mattson paper.

11 Does that sound familiar to you? M-A-T-T-S-O-N.

12 **A** No, I don't remember that one. Let me look it up.  
13 Mattson?

14 **Q** Uh-huh.

14:18:26 15 **A** Trends and Geographic Patterns in Drug and Synthetic  
16 Opioid Overdose Deaths -- United States, 2013-2019.

17 **Q** That's the one.

18 That paper found from 2013 to 2019 -- again, 2019 is  
19 the year that you're basing your OUD estimate on, correct?

14:19:03 20 **A** That estimate is based on 2019.

21 **Q** Yeah. That paper, the Mattson paper from 2013 to  
22 2019, the synthetic opioid involved death rate increased  
23 1,040 percent?

24 **A** Could we see the paper?

14:19:20 25 **Q** Sure.

1       **A**       Thank you.

2       **Q**       Okay. Do you recognize this is the Mattson paper?

3       **A**       I do. And I see on the discussion section, it says  
4       the 1,040 percent representing an increase in the death rate  
14:20:11 5       from one percent to 11.4 percent.

6       **Q**       Correct. So this paper found that the synthetic  
7       opioid death rate increased 1,040 percent from 2013 to 2019,  
8       correct?

9       **A**       Yes.

14:20:25 10       **Q**       Thank you. You can put that one down. It was a  
11       quickie.

12               Switching gears. Heroin. Heroin existed before you  
13       and I were born, correct?

14       **A**       Yes.

14:20:42 15       **Q**       Okay. It existed in the 1960s?

16       **A**       Yes.

17       **Q**       '70s?

18       **A**       Yes.

19       **Q**       '80s?

14:20:50 20       **A**       Yes.

21       **Q**       People -- people abused heroin back then?

22       **A**       Yes.

23       **Q**       People abused heroin before the present opioid crisis?

24       **A**       Yes.

14:21:03 25       **Q**       People became addicted to heroin before the present

1       opioid crisis?

2       **A**       There has been opioid addiction going back a long  
3       time.

4       **Q**       How long?

14:21:15 5       **A**       I'm not sure. I think the -- there's drug historians  
6       that you can ask about that. Many, many years.

7       **Q**       Okay. And people have been dying of heroin overdoses  
8       for a long time, right?

9       **A**       The current rate of drug overdose death is  
14:21:31 10       historically unprecedented in its height. The studies that  
11       have looked at the drug overdose rate in any recorded  
12       history in the U.S. have never seen rates as high as they  
13       are right now.

14       **Q**       Okay. That's not my question.

14:21:44 15       **A**       I apologize.

16       **Q**       People have been dying of heroin overdoses for a long  
17       time, right?

18       **A**       There have always been overdose deaths, but the rate  
19       is increasing.

14:21:52 20       **Q**       Okay. Can we just stick to my questions?

21       People have been dying of heroin overdose deaths since  
22       before the current opioid crisis, regardless of the rate?

23       **A**       Yes.

24       **Q**       Drug dealers were selling heroin before the present  
14:22:06 25       opioid crisis, correct?



1       **A**       As far as I know.

2       **Q**       And before the present opioid crisis, there was an  
3       illegal market for heroin?

4       **A**       It depends on the area of the country. But there have  
14:22:22 5       been drug markets in various areas for many years.

6       **Q**       Heroin markets?

7       **A**       Heroin markets and other kinds of drug markets too.

8       **Q**       And you said for many years, so before the current  
9       opioid crisis, correct?

14:22:44 10       **A**       Yes.

11       **Q**       Okay. Thank you.

12               Let's talk about your opinions on children.

13               Now, I know you have an 11-year old son. I have two  
14       eight-year-old daughters. And none of us take slightly any  
14:22:57 15       time a child is -- in any way has a mental health or a  
16       substance abuse disorder, okay? But I do have a few  
17       questions about your opinions on this subject.

18               You did not review any county data on children with  
19       mental health or substance abuse disorders in the counties,  
14:23:15 20       correct?

21       **A**       I spoke to people in the counties who were involved in  
22       child and family services, and I reviewed some documents  
23       that I think were publicly available from the department of  
24       health and other government agencies.

14:23:38 25       **Q**       You didn't meet with any children who have mental

1 health disorders or substance abuse disorders in the  
2 counties?

3 **A** No.

4 **Q** You didn't do any surveys of children in the counties?

14:23:50 5 **A** No.

6 **Q** You're familiar with the Lake County ADAMHS Board,  
7 right?

8 **A** Yes.

9 **Q** And the Trumbull County Mental Health and Recovery  
14:24:03 10 Board?

11 **A** Yes. Generally familiar.

12 **Q** But you didn't review any treatment data or claims  
13 data related to children with mental health or substance  
14 abuse disorders from those two organizations?

14:24:16 15 **A** No. I looked at materials that were part of public  
16 health and some of their, I think, annual reports, if I'm  
17 remembering correctly, and that's what I reviewed.

18 **Q** But you didn't ask the counties for any of their data?

19 **A** No.

14:24:32 20 **Q** You did an estimate based on the publicly available  
21 data, fair?

22 **A** My estimate is based in scientific literature.

23 **Q** And the underlying data is publicly available data?

24 **A** No. I mean, not all of these data are publicly  
14:24:50 25 available that I used in forming these estimates. Because I

1       relied on the literature.  It's published papers that I  
2       relied on.

3       **Q**       Okay.

4       **A**       I'm not sure if all of the data in those published  
14:25:02 5       papers is itself publicly available.

6       **Q**       You didn't rely on any county specific data?

7       **A**       I believe I relied on county specific data for  
8       population estimates.

9       **Q**       That's fair.  But no other county specific data?

14:25:15 10       **A**       No.

11       **Q**       Now, I want to make sure I have your estimate correct  
12       here, so just bear with me.

13               Let's assume that a child of a parent develops a  
14       mental health disorder as a result of his or her parents'  
14:25:33 15       opioid addiction.  That's the first part.

16               And then as a result of that condition, that child  
17       later develops a substance abuse disorder.

18               That child is included in your estimate?

19       **A**       So this is a situation where a child has a parent with  
14:25:54 20       an opioid disorder.

21       **Q**       Yep.

22       **A**       The child has a psychiatric disorder and later has  
23       substance use disorder as well.

24       **Q**       Mm-hmm.

14:26:02 25       **A**       Yeah, absolutely, that would be included.

1 Q And you've included substance use disorders that don't  
2 even involve -- that don't involve opioids; they don't have  
3 to involve opioids to be included in your estimate?

4 A Children of people who have opioid addiction are at  
14:26:16 5 increased risk for a broad range of substance use disorders,  
6 including alcohol use disorder, which is the most common in  
7 adolescents due to the availability of alcohol. So I  
8 included all substance use disorders due to the evidence  
9 that those kids are at risk.

14:26:32 10 Q Okay. And here's another hypothetical.

11 Suppose a person steals a prescription opioid from a  
12 friend's medicine cabinet. The person who steals the  
13 prescription opioid then transitions to heroin. The child  
14 of that person develops ADHD or learning disabilities.

14:26:52 15 That child is included in your estimate, correct?

16 A My estimate doesn't have any information about where  
17 people obtain their opioids. So it would include the  
18 disorder burden of children regardless of where their parent  
19 obtained the opioid that they became addicted to.

14:27:10 20 Q So even if their parents stole the opioid from a  
21 friend's medicine cabinet?

22 A If the parent has opioid use disorder, then stealing  
23 opioids once from a friend's medicine cabinet is not going  
24 to be the sum total of their use of opioids.

14:27:24 25 Q Okay. But your estimate would include someone who

1 never filled an opioid prescription, the parent -- strike  
2 that.

3 Your estimate includes the child of a parent -- could  
4 include the child of a parent who never filled an opioid  
14:27:41 5 prescription at a CVS or a Walmart or a Walgreens?

6 **A** Yes. This does not separate specific pharmacy chains.

7 **Q** Okay. And your estimate includes children who have  
8 had no contact at all with a CVS, a Walmart, or a Walgreens?

9 **A** This analysis is total burden, so I'm -- I don't have  
14:28:01 10 any information about whether the child's been to a CVS.

11 **Q** Okay.

12 MR. HYNES: Thank you, Dr. Keyes, for your  
13 time.

14 **CROSS-EXAMINATION OF KATHERINE KEYES**

15 **BY MS. FUMERTON:**

16 **Q** Good afternoon, Dr. Keyes. My name is Tara Fumerton,  
17 and I'm one of the attorneys for Walmart.

18 MS. FUMERTON: Your Honor, may I approach the  
19 witness with a document?

14:28:54 20 THE COURT: Okay.

21 MS. FUMERTON: Thank you.

22 Mr. Pitts, can I have the ELMO too? Or is it already  
23 up?

24 **BY MS. FUMERTON:**

14:29:21 25 **Q** Okay. Dr. Keyes, I just want to reorient us a bit, so

1 I'm going to quickly go over something that we've already  
2 talked about to ask just one set of questions. But  
3 hopefully I won't be too quick for the court reporter.

4 So what I handed to you is what -- I'll just put it up  
14:29:40 5 for the ELMO so everyone can see.

6 This is figure 7.21. And that's something that  
7 Mr. Hall was looking at you -- looking at with you earlier;  
8 is that right?

9 **A** Yes.

14:29:50 10 **Q** Okay. So we're going to hold onto that, because we're  
11 going to come back to that in a minute.

12 So as Mr. Hall went through with you, we have  
13 described what's here on the boards as your formula for  
14 coming up with your estimate of the OUD populations in Lake  
14:30:16 15 and Trumbull County, right?

16 **A** Sure. Yes.

17 **Q** Okay. And just so that it's easy for everybody to  
18 see, I'm just going to quickly put it here so we're all  
19 looking at the same thing.

14:30:24 20 You basically have 79 -- let's say this is Lake and  
21 Trumbull. You have 79 deaths in Lake County. You use a .78  
22 times your .052 -- your .0052 multiplier times three.

23 **A** Sorry. No, that's not correct.

24 **Q** That's not right?

14:30:51 25 **A** No. Oh, sorry. Then you have the times three. I

1 didn't wait till the end. I apologize.

2 Q It's all right.

3 Plus .22, times .0052, and that gives you -- I'm  
4 running out of room -- 5,934 for Lake, correct?

14:31:11 5 A Yes.

6 Q And then you do the same thing for Trumbull, and you  
7 take 103, and again .81, times the .0052, times three,  
8 plus .19, times .0052. And that gives you 7,560 as your  
9 estimate for the number of individuals with OUD in Trumbull  
10 County, correct?

11 A Yes.

12 Q And so the linchpin of this is this .052 multiplier,  
13 right?

14 A That's not how I would describe it.

14:31:45 15 Q Well, that's the death rate that you got from your  
16 Larney article, correct, that you input into the model,  
17 right?

18 A Right. But I think it's all a linchpin.

19 Q Okay. We'll get back to that in a second.

14:31:58 20 All right. So let's go back to this figure 7.21. And  
21 this, if we look down at the bottom, here we see the .52,  
22 and that's the death rate from Larney based on the 56  
23 studies that are all listed here, correct?

24 A Yes.

14:32:18 25 Q And you established with Mr. Hall earlier that seven

1 of those studies are in the U.S. and only seven studies,  
2 correct?

3 **A** Seven of them are from the U.S.

4 **Q** Okay. And if we look at the study from the U.S. that  
14:32:30 5 is the most recent study -- that would be the one that I  
6 have highlighted here, correct?

7 **A** It's most recently published. It was published in  
8 2018.

9 **Q** And do you recall what the data that was examined in  
14:32:41 10 that study?

11 **A** I think it's Massachusetts data because I know that  
12 research group very well, but I don't remember the specifics  
13 of it.

14 **Q** Any reason to disagree it's from 2012 to 2015?

14:32:53 15 **A** I'm sorry. I couldn't understand your question.

16 **Q** Yeah. Any reason to disagree that the data is from  
17 2012 to 2015?

18 **A** Is it from Massachusetts, is that --

19 **Q** I don't recall. But that's the date. You don't  
14:33:04 20 recall?

21 **A** Do we have the study?

22 **Q** Probably someplace, but I'm trying to be quick on  
23 this.

24 In any event -- let's skip over that because it might  
14:33:12 25 not be a detail that's important. We can come back to it if



1 it is.

2 In any event, the most recent U.S. study from 2018  
3 found a death rate of 2.1, correct?

4 **A** I think we need to look at the study to -- I'm not  
14:33:26 5 sure what the study population was. I don't remember  
6 offhand. I just know that it was from Massachusetts.

7 But the death rate in that study was 2.1.

8 **Q** Okay. So if we were to take your formula using the  
9 death rate from the most recent U.S. study, which is 2.1 --

14:33:46 10 **A** We wouldn't want to do that. That would be --

11 **Q** Well, wait. I haven't finished my question yet.

12 **A** Okay.

13 **Q** That 2.1 -- this study is one of the studies that you  
14 actually rely on in getting to your .52 number, right?

14:33:58 15 **A** No, you wouldn't rely on one study to do this.

16 **Q** I appreciate --

17 **A** That methodology would not be appreciate.

18 **Q** I appreciate that's not what you've done. But that  
19 2.1 is part of the .52, correct?

14:34:08 20 **A** That's one study that was in the meta-analysis.

21 **Q** Right. Because one of the other studies that you  
22 relied on, let's look, it's from Australia, right?

23 **A** Yes.

24 **Q** Another one is from Taiwan, The Netherlands?

14:34:22 25 **A** Yes.

1 Q All these 56 different studies.

2 But if we take the seven studies from the U.S. and  
3 look at the most recent one, we have a death rate of 2.1?

4 A It's the one with the highest death rate of all the 56  
14:34:34 5 studies. And one of the smallest sample sizes, I think.

6 Q So let's say we take your same formula and we do  
7 everything the same, but instead of using -- so we have  
8 the .78. And instead of using the .0052, we use the 2.1.

9 A So there's two reasons why you wouldn't want to do  
14:35:06 10 that.

11 Q I have not actually even asked a question yet.

12 A Okay.

13 Q You can wait with me.

14 A There's --

14:35:10 15 Q You can then tell me why you don't think that we  
16 should do this. But let's just go with this for a second,  
17 okay?

18 A Can I just say one thing though?

19 You can't weight it, then, because you're using data  
14:35:18 20 after 2015.

21 Q Well, none of the data that was in that study was from  
22 2015, correct?

23 A I don't know. That's what you said.

24 Q No, but you said --

14:35:35 25 A You won't show me the study.

1 (Court Reporter interjection)

2 **BY MS. FUMERTON:**

3 **Q** Right. So -- but you don't know that after 2015 is  
4 the data that was used, do you?

14:35:41 5 **A** That's what you said.

6 **Q** No. No. No. I actually said the data was from 2012  
7 to 2015. The study was published in 2018.

8 **A** Okay. If we could see the study.

9 **Q** Right. So I'm asking you to assume that to be true,  
14:35:53 10 okay?

11 **A** Okay.

12 **Q** And let's follow, and let me finish my question.

13 So if you take -- instead of using a .0052 death rate  
14 from the 56 studies, including those from outside of the  
14:36:06 15 U.S., in Taiwan and Australia, and instead look at the study  
16 for the United States that is most recent, and you use .021  
17 times three, plus the .22, times the .021, do you know what  
18 you get?

19 You have your calculator, right?

14:36:40 20 **A** You get the incorrect number of people with OUD in  
21 Lake County.

22 **Q** You get 1,469, right, using the most recent numbers  
23 from the studies you looked at from the U.S.?

24 That's the math, correct?

14:36:54 25 **A** That's the math. But that wouldn't be

1 epidemiologically sound.

2 Q And from Trumbull County, if you use the same thing,  
3 so that we used .81, times .021, times three, plus .19,  
4 times .021, you would get 1,872, correct?

14:37:24 5 A I trust you've done the math.

6 Q Okay. And even if you didn't apply the multiplier of  
7 three, which you think you would be appropriate if the data  
8 was before 2015, correct?

9 A I don't think anything that's going on here is  
14:37:40 10 appropriate, so I --

11 Q Because you don't think it would be appropriate to use  
12 the most recent U.S. study to determine what the death rate  
13 is?

14 A I don't think it would be appropriate to use that  
14:37:51 15 study to determine what the death rate is.

16 Q And the flaw in the study as you recall it is what?

17 A When you're doing a multiplier method, and as you'll  
18 see in the other paper that we talked about, you do a  
19 systematic review. Relying on one study is not a reliable  
14:38:07 20 methodology. You'd want to do a weighted average combining  
21 many different studies for a statistically reliable  
22 estimate. That's what we do in epidemiology.

23 Q Okay. But then you still agree, so besides -- you  
24 don't want to use the most recent U.S. study from 2018. You  
14:38:21 25 want to use other studies. But you agree that if you did

1 use the most recent U.S. study and you put that number into  
2 your formula, these are the numbers that you would get,  
3 which are much lower than yours, correct?

4 **A** I don't even know that that's the most recent U.S.  
14:38:34 5 study. I mean, we would need to look at the data to know  
6 whether the population is even appropriate to the study  
7 question. I mean, we haven't even looked at the -- what  
8 population did they study in that estimate?

9 **Q** That's one of the studies that you looked at as part  
14:38:48 10 of the study that you relied on, correct?

11 **A** Do you have the paper?

12 **Q** I do not have a copy of the paper with me right this  
13 minute, but this is -- it's a yes-or-no question.

14 This is one of the studies you used, correct?

14:39:00 15 **MR. LANIER:** Your Honor, may I approach the  
16 witness and give her a copy of the paper?

17 **THE COURT:** I think it might be helpful.

18 **THE WITNESS:** Okay. So these are  
19 Massachusetts adults who had an opioid overdose, who had a  
14:39:20 20 previous nonfatal opioid overdose.

21 **MS. FUMERTON:** Okay.

22 **THE WITNESS:** And that's not an appropriate  
23 population.

24 **BY MS. FUMERTON:**

14:39:25 25 **Q** So you don't think that that was appropriate to

1 something --

2 MR. WEINBERGER: Objection, Your Honor. Can  
3 she finish her answer?

4 THE COURT: This is going nowhere. I'm about  
14:39:34 5 to cut it off.

6 But please wait until the witness finishes her answer.

7 **BY MS. FUMERTON:**

8 **Q** Have you not finished your answer?

9 **A** I have not finished my answer.

14:39:41 10 That would not be an appropriate single study to use  
11 as an estimate of your entire calculation. That's why I  
12 didn't do it.

13 **Q** Okay. But you did include it as part of your overall  
14 analysis, correct?

14:39:54 15 **A** Well, it's part of the meta-analysis, and you can see  
16 the weight that it was given in the meta-analysis based on  
17 sample size and other characteristics. But you would never  
18 use that one study.

19 **Q** I appreciate that's your opinion.

14:40:09 20 Thank you.

21 **REDIRECT EXAMINATION OF KATHERINE KEYES**

22 **BY MR. LANIER:**

23 **Q** Dr. Keyes, why don't you keep that study open for just  
24 a second if it's still there.

14:40:32 25 **A** Yes.

1       **Q**       If not, I can tell you my password and you can reopen  
2       it.

3               I just want to clarify. You have trusted counsel a  
4       number of times in their questions where you've said, I'll  
14:40:47 5       take your word for it, in essence, or I'll trust that you're  
6       telling me the truth.

7               Do you remember?

8       **A**       Yes.

9       **Q**       And so, for example, you said that when Ms. Fumerton  
14:40:57 10       just told you the Larochelle study included people up  
11       through 2015.

12              Do you recall that?

13       **A**       Yes.

14       **Q**       But if you look at the actual study, it doesn't. It's  
14:41:09 15       people from 2012 to 2014; is that fair?

16       **A**       Yes. That's what the study says.

17       **Q**       Seven datasets from Massachusetts government agencies  
18       looked at retrospectively; is that fair?

19       **A**       Yes.

14:41:22 20       **Q**       And would you ever use only the Larochelle study to  
21       try and do a calculation of the number of OUD in these two  
22       counties?

23       **A**       No.

24       **Q**       Why not?

14:41:42 25       **A**       For a couple different reasons. You know, the

1 advantage of using a meta-analysis and the advantage  
2 actually of drawing on these different datasets from  
3 different countries and different time periods is that you  
4 get that weighted average estimate from across many  
14:41:57 5 different studies that arrive at these numbers using  
6 different methodologies, using different case ascertainment  
7 methods.

8 This study is people who survived an opioid overdose,  
9 and it's their risk of subsequently having another opioid  
14:42:11 10 overdose. And so, it would not be the correct study to use  
11 alone for the population of people with OUD because not  
12 everyone with OUD survives an opioid overdose.

13 Q So instead of using that alone, is that fraught with  
14 the same problems if we take any of the individual studies  
14:42:30 15 that were used as part of the cumulative meta-analysis?

16 A Yes.

17 Q In other words, if you had gone to Chang, 2017, not  
18 knowing if Chang's data is more recent than 2014 or not,  
19 that would give you a .34, correct?

14:42:51 20 A And we can look at the study, but I believe the Chang  
21 dataset did go past 2014.

22 Q So it may actually be what Ms. Fumerton was  
23 referencing to as the most recent data in the United States.  
24 But if you had used that, it would have dramatically  
14:43:08 25 increased the numbers you gave, wouldn't it?



1       **A**       Yes.

2       **Q**       Would it be right and proper to use that singular  
3 study?

4       **A**       No.

14:43:17 5       **Q**       So when you use a meta-analysis -- and the Court asked  
6 this, but I want to make sure that the record is clear --  
7 the meta-analysis, does it take into account all of these  
8 different studies from all of these different places?

9       **A**       Yes.

14:43:34 10       **Q**       And did you individually filter out for just the  
11 United States to determine if you're using only the United  
12 States data, whether or not it's representative? Did you do  
13 that work?

14       **A**       Yes.

14:43:48 15       **Q**       Can you tell the Court and the record what you found?

16       **A**       When you just stratify the meta-analysis to only the  
17 U.S. studies, the results are very similar.

18       **Q**       And by meta-analysis, again, did the meta-analysis not  
19 only take into account all of these different studies --

14:44:11 20               And how many were there?

21       **A**       56.

22       **Q**       But did it weight them by proper weights in person  
23 years?

24       **A**       Yes. It weights based on sample size and other  
14:44:26 25 characteristics as well.

1 Q So that you're ultimately doing apples to apples with  
2 a huge database instead of pulling out high points, low  
3 points, outliers, things of that nature?

4 A That's right.

14:44:40 5 Q And is that what epidemiologists do when they want to  
6 be thorough and correct?

7 A Yes.

8 Q All right. I want to go back through a number of  
9 other questions.

14:44:52 10 I'm going to start at the start of the  
11 cross-examination. I don't know how His Honor keeps his  
12 notes, but assuming that they're kept in some way like that,  
13 I'll go at the start and we'll work backwards.

14 First of all, first thing you were asked is the role  
14:45:10 15 of manufacturers and others. You were given deposition  
16 testimony, did others play a role, but for them it never  
17 would have happened.

18 Remember all of those questions?

19 A Yes.

14:45:23 20 Q Now, we're not rehashing the first phase of this  
21 trial.

22 A Okay.

23 Q But were you privy, when you gave that testimony in  
24 the first phase of this trial, to any of the evidence of  
14:45:37 25 pharmacies working with the manufacturers?

1       **A**       Yes. I saw some of that evidence.

2       **Q**       Does the fact that manufacturers had the role that  
3 they had change any of your synergy argument for how there's  
4 responsibility that can be caused by the oversupply from  
14:45:59 5 pharmacies? Does it change your argument?

6       **A**       No. That's the argument in my report, that -- the  
7 synergy between them.

8       **Q**       In that regard, I want to ask you if I'm fair using  
9 the example of a car wreck.

14:46:15 10               So here's my example: This is car one. Car one is  
11 being driven by a fellow who is totally tanked, inebriated,  
12 okay, blows through a red light, smashes into car number  
13 two, severely injuring somebody in car number two.

14               You got the scenario?

14:46:39 15       **A**       I do.

16       **Q**       Car number two's inhabitant gets rushed to the  
17 hospital. In the hospital, a doctor commits malpractice,  
18 and as a result, the person has grievous injuries that they  
19 won't recover from.

14:47:00 20               Okay?

21       **A**       Okay.

22       **Q**       And you could say that but for the car wreck, that  
23 person would never have those injuries, fair?

24               MR. DELINSKY: Objection, Your Honor.

14:47:16 25               Outside the scope of the witness's expertise.

1 THE COURT: Overruled.

2 BY MR. LANIER:

3 Q But, Dr. Keyes, as a practical matter, there -- would  
4 you agree with me that there can be other people at fault  
14:47:28 5 later down the domino chain that should not be excused for  
6 their behavior just because there were other people up front  
7 of the domino chain?

8 MR. DELINSKY: Objection, Your Honor.

9 Outside of the witness's expertise.

14:47:47 10 MR. LANIER: I'll ask it this way, Your Honor.

11 THE COURT: Actually, this is more argument  
12 than a question for Dr. Keyes.

13 MR. LANIER: It is. I'll move on.

14 THE COURT: I agree.

14:47:49 15 MR. LANIER: I'll move on. I'll move on,  
16 Judge.

17 BY MR. LANIER:

18 Q Let's go to some of the chart numbers for a moment  
19 just to make sure our record is clear.

14:48:08 20 You were asked in one of the charts done by the  
21 Walgreens attorney, you listed for Lake 97 deaths in his  
22 cumulative five-year analysis.

23 Remember that?

24 A Yes.

14:48:24 25 Q Those 97 were direct for Lake, 94 direct for Trumbull,

1 true?

2 **A** Yes.

3 **Q** That left -- you also had 135 for Lake that were  
4 indirect, true?

14:48:40 5 **A** Yes.

6 **Q** 189 for Trumbull indirect, true?

7 **A** Yes.

8 **Q** And then you said a phrase that I want you to  
9 elucidate on the record.

14:48:49 10 Those that were not attributed to prescription  
11 opioids, you said something about to the transition were 118  
12 and 163.

13 That "to the transition" that you added there, explain  
14 what you meant.

14:49:06 15 **A** So in that analysis, I was estimating the proportion  
16 of those deaths that were attributed to people transitioning  
17 from prescription opioids to nonprescription opioids.

18 So that -- that analysis was just limited to that one  
19 pathway, but, of course, there could be other pathways more  
14:49:29 20 broadly linking the oversupply of prescription opioids in  
21 Lake and Trumbull County to these deaths. It just wasn't  
22 captured in that particular, you know, people start with  
23 prescription opioids and then transition to heroin pathway.

24 **Q** So, for example -- well, I won't argue it. I'll have  
14:49:47 25 you put it in your words.

1 Indivisibility of the cake, how does a prescription  
2 oversupply affect even that not-attributed number? How can  
3 oversupply, even though it's not a direct or indirect  
4 attribution, how can it affect those remaining numbers?

14:50:09 5 **A** So as I wrote in my report, and I think we talked  
6 about earlier, when you have -- the concept of synergy in  
7 epidemiology, you know, we think about these types of  
8 environmental transitions all the time where, for example,  
9 you have prescription opioid oversupply in a particular  
14:50:29 10 community. That renders people in that community more  
11 vulnerable to OUD. Now you've got a bunch of people with  
12 new OUD in your community, and that provides a market for  
13 illicit drug sales, for example, from drug dealers because  
14 now you have people who are more primed to transition from  
14:50:48 15 prescription opioids to heroin use. And, in fact, that's  
16 what we saw in a lot of places in this country.

17 So once kind of you have this opioid-rich environment,  
18 it is fertile soil for a broader array of harms to the  
19 community that may unfold over years.

14:51:05 20 **Q** Are you capable of answering a question about whether  
21 or not epidemiology, your expertise, indicates that if there  
22 is a market in a county of one potential heroin user or a  
23 market of a thousand potential heroin users, whether or not  
24 the heroin distribution ring is more likely to go to the one  
14:51:31 25 or the thousand?

1       **A**       Yes, I'm capable of answering the question.

2       **Q**       And what would the answer be, please?

3       **A**       You know, we know from the epidemiological literature  
4       and other kinds of literature from other kinds of  
14:51:45 5       disciplines as well that heroin dealers and distributors  
6       went to areas where they thought more people had OUD.

7       **Q**       Okay. Next subject.

8               You were asked about Dr. Alexander using your top line  
9       numbers, and you started to explain why it was appropriate  
14:52:02 10      and were cut off.

11              Would you put on the record why it's appropriate for  
12      Dr. Alexander to use those top line numbers?

13      **A**       Because those are the number of people with OUD, the  
14      total number of people with OUD. And so, if -- and you can  
14:52:15 15      correct me if I'm misunderstanding, but if the purpose is to  
16      determine what kinds of services and what kinds of abatement  
17      is needed in Lake and Trumbull County, then you'd need to  
18      know how many people have OUD in that county.

19      **Q**       Okay. Thank you.

14:52:29 20              Next, you were asked, did you do surveys in Lake and  
21      Trumbull Counties.

22              My question is: Did you need to?

23      **A**       No.

24      **Q**       Did you do proper epidemiology?

14:52:43 25      **A**       In my opinion, as a professor of epidemiology, yes.

1 Q Are you aware of the fact that the defendants do not  
2 have an epidemiologist to fuss with you on any of this?

3 A I'm not aware of what they have.

4 Q The reports of the defendants' experts that are  
14:53:03 5 challenging you, did you see any epidemiologists in there?

6 A No, it was very clear they did not have epidemiology  
7 training.

8 Q Next subject.

9 You were quizzed on didn't use treatment data for  
14:53:18 10 estimating OUD.

11 Why is the ADAMHS Board's treatment data not your best  
12 source or most accurate source?

13 A As I said before, again, this is kind of -- I mean,  
14 historically, this is basically the reason psychiatric  
14:53:38 15 epidemiology as a field came into existence, is that people  
16 realized they couldn't rely on treatment data to estimate  
17 things like the number of people with OUD or any, you know,  
18 schizophrenia in their community. If you just take the  
19 people who are in treatment, you're only seeing one small  
14:53:54 20 piece of the picture.

21 And so, the field of epidemiology was really created  
22 to say, okay, let's actually go to the community and count  
23 the number of people who are not in care to try to get a  
24 better, more accurate estimate.

14:54:06 25 Q All right. Next subject.



1           You were asked about whether or not you interviewed  
2    OUD people in the county.

3           Do you remember that question?

4    **A**     Yes.

14:54:16 5    **Q**     Or set of questions.

6           Does any of that change your epi opinion?

7    **A**     No. The field of epidemiology, we rely on kind of  
8    population totals rather than each individual person with  
9    OUD. We're trying to count the total number of people.

14:54:32 10   **Q**     So, for example, the Larney meta-analysis that covered  
11    hundreds of thousands of people across the world, do you  
12    think Dr. Larney interviewed all of those people?

13   **A**     I don't think so.

14   **Q**     It would be almost impossible to in a meta-analysis,  
14:54:50 15   fair?

16   **A**     I've conducted many meta-analyses myself, and I have  
17    not gone and interviewed everyone that I included in my  
18    meta-analyses.

19   **Q**     All right. Next set of questions about your paper  
14:55:01 20   that was just recently published.

21           Role of funding source.

22           Do you see that?

23   **A**     Yes.

24   **Q**     Now, these notes at the end of a paper like this are  
14:55:17 25   strictly applied with strict rules and instructions on what

1 you're supposed to say and answer; is that fair?

2 **A** Yes.

3 **Q** And did you answer this correctly?

4 **A** I did.

14:55:29 5 **Q** Was there a funding source for this paper?

6 **A** Yes.

7 **Q** What was the funding source for the paper?

8 **A** The NIH.

9 **Q** Declaration of competing interest.

14:55:42 10 You were asked whether or not you said anything about

11 which side you were working on in the litigation.

12 Do you see that?

13 **A** Yes.

14 **Q** Did you, in fact, say that this was a competing

14:55:54 15 interest?

16 **A** Yes.

17 **Q** Okay. Does -- I mean, have you ever hidden from what  
18 you're doing in this case?

19 **A** No. My department tweets about it all the time.

14:56:10 20 **Q** Thank you.

21 And then, as to the limitations that were listed on  
22 page five of your report by Mr. Hynes, those limitations  
23 included this assumption: The meta-analytic estimate  
24 accurately captures the mortality rates in the U.S. OUD  
14:56:30 25 population.

1 Do you see that?

2 **A** Yes.

3 **Q** But then, this was not read: However, the U.S.  
4 studies included in the meta-analysis were consistent with  
14:56:43 5 the average estimate across all countries.

6 Can you explain what you meant in that section unread?

7 **A** So in the published paper about the method, I did a  
8 sensitivity analysis, which is commonly done in epi papers,  
9 where I just looked at the studies that were based in the  
14:57:04 10 U.S., and I redid all the calculations leaving out any study  
11 that was from a non-U.S. country.

12 And the results were very consistent.

13 **Q** Okay. Next subject.

14 You were asked about your earlier report and the  
14:57:20 15 multiplier that you used in that earlier report.

16 Do you remember those questions?

17 **A** Yes.

18 **Q** And that earlier report was handed to you and a copy  
19 was handed to me. It showed that date to be March of 2019.

14:57:36 20 Does that seem right to you?

21 **A** That -- that sounds right.

22 **Q** Let's make sure the record is precise.

23 Submitted March 24th, 2019.

24 Is that your signature?

14:57:53 25 **A** Yes.

1 Q And in this report, you used a .65 multiplier; is that  
2 right?

3 A Yes.

4 Q Then, over a year later, the Larney paper comes out,  
14:58:08 5 true?

6 A That's right.

7 Q Now, Larney gives a peer-reviewed figure that you use  
8 of .52.

9 Fair?

14:58:23 10 A Yes.

11 Q Before you had that peer-reviewed number, were you  
12 extra conservative in your estimate?

13 A Yes.

14 Q In other words, you were coming up with the -- a lower  
14:58:38 15 number than what the peer-reviewed literature ultimately  
16 showed to be perhaps a more accurate factor in the formula,  
17 fair?

18 MR. DELINSKY: Objection, Your Honor.

19 THE COURT: Overruled.

14:58:53 20 THE WITNESS: I guess what I would say is  
21 that .65 was based on a previous meta-analysis. The .52 was  
22 based on an updated meta-analysis, so more studies, more  
23 data. So I always try to use the most relevant study, and  
24 so, when a new study came out that had even more data  
14:59:12 25 included in it, I used that estimate.

1 BY MR. LANIER:

2 Q Well, that was final question.

3 Is it right to use Larney, and, if so, why? Anything  
4 to add to that than what you've just told us?

14:59:24 5 A It's the most recent study, the most rigorous study  
6 that's been done, it included the most datasets, the most  
7 people, and, therefore, I thought it was the right estimate  
8 to use.

9 Q All right. Next subject.

14:59:38 10 The Mallow study, you said this was apples to oranges.  
11 Please explain.

12 A I -- I'll try. But this study is using a totally  
13 different methodology. It is a multiplier method, but the  
14 data -- the approaches are not comparable. They're --  
15:00:04 15 they're using two different approaches.

16 Q Is it even possible for a study that was published in  
17 2019, is it even possible for that study to be using the  
18 Larney material?

19 A No.

15:00:18 20 Q Why?

21 A It was published before the Larney paper came out.

22 Q Last subject.

23 You were asked about the NSDUH used by Dr. Alexander  
24 in his modelling paper.

15:00:38 25 Do you recall that?

1       **A**       I do.

2       **Q**       And we'll have Dr. Alexander on the stand to explain,  
3 but do you have any testimony about the difference between a  
4 modelling paper and estimating OUD numbers for the counties  
15:00:52 5 like you've done here?

6       **A**       Yes. And, you know, I do a lot of mathematical  
7 modelling myself, and I use the NSDUH data when I'm  
8 mathematically modelling depending on what research question  
9 I'm asking and what the purpose is.

15:01:07 10               But -- so he was not trying to estimate the number of  
11 people with OUD in a specific county for that analysis, so  
12 it's not -- the fact that he used the NSDUH OUD numbers for  
13 a different analysis isn't really relevant to OUD.

14       **Q**       And if His Honor had been provided with all of the  
15:01:28 15 language in the actual paper by Dr. Alexander, on page 975,  
16 where he makes the statement that: Data sources such as  
17 NSDUH have well-described limitations, it makes it, for  
18 example, difficult to identify long-term trends from year to  
19 year population without additional years of confirmation.

15:01:56 20 As our model was calibrated to total overdose deaths rather  
21 than the number of people with OUD, our estimates of the  
22 size of population may be biased.

23               Would you agree with his assessment of the limitations  
24 of NSDUH?

15:02:11 25       **A**       Yes.

1 MR. LANIER: Thank you.

2 Your Honor, I pass the witness.

3 THE COURT: Okay.

4 MR. HALL: Your Honor, can I just have very  
15:02:21 5 brief recross?

6 THE COURT: Well, I want to give our court  
7 reporter a break. There may be several of you who want to  
8 do recross, so we'll take a 15-minute break and then  
9 conclude with the balance of the doctor's testimony.

15:02:33 10 (Recess taken at 3:02 p.m.)

11 (Court resumed at 3:23 p.m.)

12 THE COURT: Okay. Any recross?

13 MR. HALL: Yes, Your Honor, very briefly.

14 THE COURT: Okay.

15:23:43 15 **RECROSS-EXAMINATION OF KATHERINE KEYES**

16 **BY MR. HALL:**

17 **Q** Dr. Keyes, I want to focus on one area you were just  
18 asked about before the break, and it referred to the  
19 so-called top line numbers. I don't mean to denigrate them  
15:24:01 20 by saying "so-called," but I referred to them that way as  
21 well.

22 And if we refer to board 34, by top line, you  
23 understood we're referring to your OUD estimates for Lake  
24 and Trumbull County in 2019 of 5,934 and 7,560 respectively,  
15:24:38 25 right?

1       **A**       Yes.

2       **Q**       And you were asked why was it appropriate if  
3       Dr. Alexander used those top line numbers instead of numbers  
4       that were adjusted to reflect your estimates of OUD directly  
15:24:59 5       or indirectly attributable to prescription opioids, correct?

6               Do you recall that?

7       **A**       Yes.

8       **Q**       And you said: It's appropriate to use the top line  
9       numbers, if that's what Dr. Alexander did, because those are  
15:25:17 10       the number of people with OUD, the total number of people  
11       with OUD. And if the purpose is to determine what kinds of  
12       services and what kinds of abatement is needed in Lake and  
13       Trumbull County, then you need to know how many people have  
14       OUD in that county.

15:25:34 15              Do you recall that testimony?

16       **A**       Yes.

17       **Q**       And I just want to make sure we're clear about your  
18       testimony there.

19              When you say what is needed for the abatement and  
15:25:44 20       other services in the counties, you're referring to what is  
21       needed to abate the opioid crisis in Lake and Trumbull  
22       County. That's what you were referring to?

23       **A**       That's what I'm referring to, yes.

24       **Q**       Yeah. And including all the effects of heroin,  
15:26:04 25       fentanyl, and other synthetic opioids, regardless of whether



1 they are directly or indirectly attributable to prescription  
2 opioids. That's why it's your testimony that he should use  
3 the top line numbers?

4 **A** Well, not exactly. The direct and indirect  
15:26:23 5 attribution that I did in that analysis referred to the  
6 indirect pathway was just one pathway. It was between  
7 prescription opioid use and heroin use.

8 The total number of people with OUD would reflect  
9 other pathways as well, so --

15:26:39 10 **Q** Including -- and the top line numbers include the  
11 pathway of heroin, fentanyl, and other synthetic opioids?

12 MR. LANIER: Judge, I want to object. I'm not  
13 sure she was through with her answer, and he cut her off.

14 **BY MR. HALL:**

15:26:51 15 **Q** Were you through? I didn't mean to.

16 **A** I guess, if I could give a fuller answer, it would be  
17 that the total number of people with OUD would reflect all  
18 pathways. Some people who were currently using heroin  
19 started with prescription opioids. Some people who are  
15:27:07 20 using -- currently using heroin were exposed to a  
21 opioid-rich environment.

22 So a total number of people with OUD would reflect all  
23 pathways, including ones that are reflected in that  
24 analysis, and other pathways as well.

15:27:23 25 **Q** And what you're referring to, then, is abatement and

1 services for the counties to address all aspects of the  
2 opioid crisis in those counties, including all related to  
3 heroin, fentanyl, and other synthetic opioids. That's the  
4 top line number you're referring to?

15:27:40 5 **A** I guess I don't separate those cases of OUD from the  
6 others. I mean, you need to know how many people have OUD  
7 in your county.

8 **Q** If you're going to abate the opioid crisis in those  
9 counties?

15:27:51 10 **A** Yes.

11 MR. HALL: Pass the witness, Your Honor.

12 THE COURT: Okay. Anything else?

13 MR. HYNES: Your Honor, nothing for CVS.

14 MS. FUMERTON: Nothing for Walmart, Your  
15 Honor.

16 THE COURT: Okay. Thank you very much,  
17 Dr. Keyes. You may be excused.

18 THE WITNESS: Thank you.

19 THE COURT: Okay. I guess we need to deal  
15:28:23 20 with exhibits, because that's the only witness we have for  
21 today, correct?

22 MR. LANIER: That is correct, Your Honor.

23 And we are ready to deal with exhibits if you are.

24 THE COURT: Well, what exhibits are the  
15:28:37 25 plaintiffs offering?

1 MR. LANIER: Your Honor, the first exhibit we  
2 offer is 23117. That is Dr. Keyes' curriculum vitae.

3 THE COURT: Any objection to that?

4 MR. HALL: Not really. No objection to it  
15:28:53 5 being offered for identification for demonstrative purposes.  
6 It doesn't seem like substantive evidence to me, Your Honor,  
7 and I guess we do object to it for that purpose.

8 THE COURT: Well, typically -- I mean,  
9 typically, since there was no challenge to her -- no *Daubert*  
15:29:14 10 challenge to her expertise, I don't know, the CV -- but this  
11 is a bench proceeding, so I don't see what the objection to  
12 the CV is. So I think it should come in, so I'll admit it.

13 MR. LANIER: Thank you, Your Honor.

14 Our next tender is Plaintiffs' Exhibit 23116. This is  
15:29:35 15 Dr. Keyes' expert report. And in the interest of trying to  
16 minimize or perhaps even eliminate any objections, we just  
17 offer into the report those pages that are non-hearsay pages  
18 that have the opinions that she testified about solely in  
19 phase II. So that's, what, we're talking about seven or  
15:29:58 20 eight pages, that have the charts that we used.

21 THE COURT: All right. It seems to me those  
22 charts should come in.

23 Is there any objection to the charts?

24 MR. HALL: The charts are one thing. The  
15:30:08 25 pages have a lot of text on them, and we would want to take

1 a look at those.

2 THE COURT: Well, why don't you look on it.

3 The point is that her opinions are not hearsay. She  
4 testified to them. And her calculations are not hearsay.

15:30:22 5 She testified to them. And I think it's useful to have --  
6 it will be a lot easier for any reviewing court if they see,  
7 all right, here are these charts, this is what she said.  
8 You haven't had to go through every little line.

9 MR. HALL: Well, I guess what I'm referring to  
15:30:37 10 is not the charts and her opinions, it is the detailed text,  
11 the footnotes to the text that are included on the pages  
12 that were shown. I'm just not sure which ones plaintiffs  
13 are offering. If we could take a look at them, we could  
14 have a firm --

15:30:50 15 THE COURT: We've got a little time now.  
16 Let's look at what are you offering, Mr. Lanier?

17 MR. HALL: We'll look at them tonight.

18 MR. LANIER: Yeah. And, Your Honor, we're  
19 offering the pages that I showed on the ELMO while I  
15:30:58 20 discussed them with her, which would be pages 56, 57, 58,  
21 and 60, along with the charts, which I believe are on those  
22 pages.

23 THE COURT: All right.

24 MR. HALL: Can we take a look at those  
15:31:12 25 tonight?

1 THE COURT: Why don't you look at them  
2 tonight. If there's something in a footnote you think is  
3 hearsay and should be out, we can delete a footnote. I  
4 mean, that's --

15:31:20 5 MR. HALL: We will, Your Honor.

6 Thank you.

7 THE COURT: All right.

8 MR. LANIER: And then finally, Your Honor, we  
9 offer Plaintiffs' Exhibit 22481, which is just the -- I  
15:31:26 10 think two pages of the rebuttal report. If the defendants  
11 would look at that as well tonight, that would be useful.

12 THE COURT: Okay. Why don't we do the same  
13 thing.

14 What pages specifically, Mr. Lanier?

15:31:37 15 MR. LANIER: Pages one and two. Pages one,  
16 two, and three, excuse me, of the Keyes rebuttal expert  
17 report.

18 MR. HALL: Is that the entire report?

19 MR. LANIER: I think so, yes.

15:31:47 20 MR. HALL: We'll look at that as well.

21 THE COURT: All right. Look at that.

22 MR. LANIER: And that concludes plaintiffs'  
23 tender, Your Honor.

24 THE COURT: Anything the defense is offering?

15:32:05 25 MR. HALL: No, Your Honor, not beyond those

1 marked for identification on the record, which we'll take  
2 photographs of and just have them in the record as  
3 demonstratives.

4 THE COURT: Okay. They were demonstratives.

15:32:18 5 MR. HALL: Not offered for substance.

6 THE COURT: Okay. And there were a bunch of  
7 articles shown to the witness, but they weren't really  
8 identified.

9 MR. HYNES: Yeah. And, Your Honor, if it's  
15:32:23 10 okay with you, we'll identify those articles as  
11 demonstratives for the record but not move to admit them.

12 THE COURT: All right. That's fine.

13 MS. FUMERTON: Your Honor, just as well, I  
14 think I forgot to mark this as a demonstrative, but we'll  
15:32:34 15 mark it as a demonstrative, not to be put into evidence.

16 THE COURT: Okay.

17 MS. FUMERTON: Thank you, Your Honor.

18 MR. HYNES: We'll just work with the court  
19 reporter on that.

15:32:38 20 Thank you.

21 MR. LANIER: And I clearly have no objections,  
22 Your Honor, for any of those purposes.

23 THE COURT: Okay.

24 MR. DELINSKY: Your Honor, at the appropriate  
15:32:51 25 moment, we have two housekeeping issues we would like to

1 raise.

2 THE COURT: Okay. Yes, Mr. Delinsky.

3 MR. DELINSKY: Thank you, Your Honor.

4 Your Honor, obviously, in our posttrial briefing,  
15:33:03 5 we'll be mounting attacks and arguments not to Ms. Keyes'  
6 qualifications but to the integrity of her OUD estimates.  
7 They will come by way of *Daubert*. We'll be putting them in  
8 our posttrial briefings.

9 And even though they sounded *Daubert*, it sort of -- it  
15:33:25 10 doesn't matter, you know. One way of looking at it is  
11 *Daubert*. Another way is we're going to argue --

12 THE COURT: It's too late to do a *Daubert*  
13 challenge. I mean, she testified, so --

14 MR. DELINSKY: No, Your Honor, it's never too  
15:33:36 15 late to -- we're not doing it based on qualifications. It's  
16 never too late based on the testimony that has come in to  
17 say that it doesn't meet the standard.

18 We're not asking you to decide it now. We're just  
19 saying we wanted to raise the issue as soon as she sat down  
15:33:50 20 and we got the testimony. We heard it. And now we want to  
21 tell you that we're going to be making those arguments in  
22 posttrial briefing.

23 THE COURT: Well, Mr. Delinsky, do whatever  
24 you want. But, again, I'm going to weigh -- I'm going to  
15:34:05 25 weigh the plaintiffs' witnesses against your witnesses. I'm

1 going to weigh your witnesses against theirs. And you don't  
2 have any epidemiologist, okay? So if you don't, you know,  
3 she's the one, okay?

4 So you can put anything you want in your brief, but  
15:34:23 5 you need to understand that, as I said, I'm going to put  
6 plaintiffs' witnesses against comparable witnesses that you  
7 have and vice versa. And I'm going to have to make some  
8 decisions, and I may -- you know, I can accept a witness in  
9 all or part or none, but I -- you know, I'm going to -- I'm  
15:34:46 10 going to certainly weigh the testimony of a witness, if I  
11 find the witness credible, a lot more than whatever counsel  
12 says because that's the testimony. What you say is  
13 argument. So both sides should understand that.

14 So I think the best way to present something to me  
15:35:03 15 that you want me to consider in the abatement plan is  
16 through the testimony of a witness who's going to  
17 substantiate it, going to say, look, this is what -- you  
18 know, this is what the facts on the ground are and this is  
19 what should be included, this amount, and this is what  
15:35:21 20 shouldn't be included or different amounts.

21 So both -- I mean, that's what I tried to highlight in  
22 our phone discussion. So, again, people can file whatever  
23 they want, but I'm going to base my decision largely on the  
24 testimony I hear. That's the whole point of the hearing.

15:35:40 25 MR. DELINSKY: We just want to make sure we



1 will have the opportunity in our posttrial briefs to  
2 identify problems in the testimony. That's all. I don't  
3 think it's anything different from what Your Honor expected  
4 or --

15:35:53 5 THE COURT: Again, the -- but it's -- if the  
6 only epidemiologist that I hear from is the plaintiffs', and  
7 I determine that epidemiological witness testimony is  
8 important, that's what I've got, okay. So you may  
9 consider -- it's a little late to come up with one, probably  
15:36:20 10 way too late, but you should understand that.

11 MR. DELINSKY: No, no, no. Your Honor, we're  
12 just talking about we're going to make a record of the four  
13 corners of Dr. Keyes' testimony, by way of example, and say  
14 we don't think this is credible, we don't think it meets the  
15:36:36 15 standards that --

16 THE COURT: Okay. But again, then if you're  
17 not putting forth something better, I don't have anything  
18 better, unless you're saying ignore her completely and give  
19 them zero. The point is you've got to give me something.

15:36:49 20 MR. DELINSKY: We will be providing you with  
21 alternatives, Your Honor.

22 THE COURT: All right. That's fine.

23 Again, just -- either side just saying no isn't going  
24 to be of much use or, candidly, of much value. You want to  
15:37:01 25 say, all right, this isn't -- this isn't accurate or this

1 isn't correct and this is, and there's some basis for it,  
2 obviously, I'll look carefully at it.

3 MR. DELINSKY: Your Honor, the second issue  
4 I'd like to raise pertains to Dr. Alexander. And we've been  
15:37:17 5 working with the -- with plaintiffs' counsel on this issue.  
6 And I fear that plaintiffs' counsel is cooperating with us  
7 but is in a difficult position themselves. I think we could  
8 use your help.

9 Dr. Alexander has submitted reports in a few other  
15:37:33 10 cases, I think, for instance, the state of Washington is  
11 one, state of Rhode Island is one. And those reports are  
12 designated as confidential, and there's a lot of -- it's  
13 difficult to get the necessary approvals.

14 Plaintiffs are trying to get those to us, but we need  
15:37:50 15 them. And he's testifying as soon as tomorrow.

16 So my request to you, Your Honor, is that you order  
17 plaintiffs to produce those reports to us. I think that  
18 will help plaintiffs, personally, because it -- I get the  
19 sense that this is somewhat of a headache for them.

15:38:14 20 MR. WEINBERGER: Your Honor, thank you. My  
21 friend Mr. Delinsky is trying to keep me from a headache.  
22 Well, it's not really a headache.

23 The situation is this: Before Dr. Alexander gave his  
24 deposition in March, there was a request that we provide a  
15:38:37 25 lot of background information, including other reports that

1 he had issued in other cases, his billings, et cetera, et  
2 cetera.

3 Last Wednesday, I got an email from Mr. Hynes saying  
4 that they wanted, among other things, his reports in Rhode  
15:38:59 5 Island, in the state court action in Rhode Island, and his  
6 report in the state court action in -- by the Washington  
7 Attorney General in the state of Washington.

8 And he wanted --

9 THE COURT: Let me -- has he -- did he testify  
15:39:16 10 in both proceedings, Washington --

11 MR. DELINSKY: Yes, he did, in Washington.

12 MR. WEINBERGER: I believe he testified in  
13 Washington.

14 MR. DELINSKY: I believe Rhode Island he'd  
15:39:31 15 settled before --

16 MR. WEINBERGER: Right. So both of those --  
17 vis-a-vis the depositions and the reports, both of those are  
18 subject to a protective order in state court.

19 THE COURT: All right.

15:39:37 20 MR. WEINBERGER: So what we said is sign the  
21 protective order and, you know, we will turn them over.

22 But we also need to get client approval. That's  
23 according to the lawyers who represent Rhode Island and  
24 Washington. We're working our way through that.

15:39:53 25 They also wanted the deposition that he gave in San

1 Francisco, in the San Francisco case before Judge Breyer,  
2 and we had previously furnished that deposition back in  
3 February, I think it was.

4 THE COURT: All right. Well --

15:40:08 5 MR. WEINBERGER: So --

6 THE COURT: So they have that. They have San  
7 Francisco. So we're talking about his --

8 MR. WEINBERGER: So I --

9 THE COURT: This is his report -- wait. His  
15:40:20 10 report is under confidentiality?

11 MR. WEINBERGER: Yes. Just like in this case,  
12 they were marked confidential, privileged and confidential,  
13 but they have -- partly, they have information associated  
14 with the defendants; partially, they have information  
15:40:32 15 associated with the client itself, with the plaintiff.

16 You know, I can't -- I don't have the -- I don't have  
17 them, so I can't tell you what -- if I look through them,  
18 what I could tell would be confidential or not. But they  
19 are subject to a protective order.

15:40:45 20 THE COURT: What does the protective order  
21 say? You can only use it in a court proceeding, I assume.  
22 That's what we've got. They can't go publishing --

23 MR. WEINBERGER: I haven't seen the protective  
24 order, Your Honor.

15:40:56 25 Is Mildred here?

1 THE COURT: Peter, I thought you said you'll  
2 give them to the defendants so long as they sign the  
3 protective order.

4 MR. WEINBERGER: That's --

15:41:04 5 THE COURT: But you haven't seen the  
6 protective order? I thought you -- how --

7 MR. WEINBERGER: Look, I'll work through the  
8 client approval issue. I don't really understand that.

9 THE COURT: Which clients?

15:41:18 10 MR. WEINBERGER: The Rhode Island and the  
11 state of Washington, okay? The expert was retained by the  
12 attorney general in both of those cases and --

13 THE COURT: We're not trying to steal the work  
14 product. It's the opposite. They may cross-examine him on  
15:41:32 15 it.

16 MR. WEINBERGER: So one of my colleagues,  
17 Mildred Conroy, had been working through this with  
18 Mr. Hynes.

19 Do you have the protective order?

15:41:42 20 MR. HYNES: I have the Washington AG one. We  
21 got it today. We can sign it right now. But I think it's  
22 the client approval issue that --

23 THE COURT: All right. Peter will take care  
24 of the client approval, Mr. Hynes. If you just sign the --  
15:41:52 25 fine.

1           Is there a similar protective order for Rhode Island?  
2       If so, you should sign that.

3           MR. HYNES:   These were given to me at lunch,  
4       and I was busy this afternoon.

5           THE COURT:   All right.

6           MR. HYNES:   I have California and Washington.  
7       I do not -- oh, wait, there's one more.

8           I do not have Rhode Island.

9           THE COURT:   Well --

15:42:07 10           MR. LANIER:   Judge, I'll represent that he'll  
11       have Rhode Island in his email within 30 minutes.

12           THE COURT:   All right.

13           MR. HYNES:   And I'll put on the record that  
14       we'll comply with the protective order.

15:42:15 15           THE COURT:   All right. That's fine. Okay.

16           MR. DELINSKY: And, Judge, we just want to  
17       make clear, we were not casting any aspirations.

18           THE COURT:   I understand. I understand that.  
19       But I mean, you know, another court has a protective order,  
15:42:25 20       and so as long as you sign it, that's fine.

21           Okay. So defense counsel will sign the protective  
22       order, and the plaintiffs will take care of clients, and so  
23       the reports can be produced. Okay. So the Court doesn't  
24       have to do anything. Fine. Well, that was the idea.

15:42:50 25           I'd rather not, you know, countermand another judge.

1 I think that's something to be done very, very sparingly.

2 Okay. Anything else like that? Or anything else at  
3 all?

4 MR. LANIER: Nothing else for plaintiff, Your  
15:43:06 5 Honor.

6 THE COURT: Defendants?

7 MR. HALL: Your Honor -- sorry.

8 MS. FUMERTON: I was just going to say a  
9 housekeeping matter. If you have something more  
15:43:12 10 substantive...

11 MR. HALL: No, I don't have anything.

12 MS. FUMERTON: Oh, just for a housekeeping  
13 matter, just like in phase I, could we get a copy of the  
14 demonstratives? We're happy to give the same to you at the  
15:43:21 15 end of every day.

16 MR. LANIER: We've already set them aside to  
17 picture and email them to you.

18 MS. FUMERTON: Perfect. Thank you.

19 MR. DELINSKY: We'll do the same.

15:43:27 20 MR. WEINBERGER: What time are we starting  
21 tomorrow? Was tomorrow the day that we were starting a  
22 little bit later?

23 THE COURT: Tomorrow we've got 8:30. Tomorrow  
24 is 8:30.

15:43:34 25 MR. WEINBERGER: Okay.

1 THE COURT: All right. I was keeping sort of  
2 rough time.

3 I had 1.5 for the plaintiffs and 3 for the defendants.  
4 So we ended early today.

15:43:55 5 Okay. Have a good evening, and --

6 MR. LANIER: Judge, I hate to be persnickety.

7 What did you give for plaintiff and what did you give  
8 for defendant?

9 THE COURT: I had 1.5 and 3.

15:44:12 10 MR. LANIER: I had me going from 9:33 this  
11 morning to 10:25, for 55 minutes.

12 THE COURT: Well, I sort of round off to a  
13 quarter. All right?

14 MR. LANIER: So just give me an hour there.

15:44:25 15 And then I went for 20 minutes this afternoon. So I guess  
16 that's --

17 THE COURT: Maybe it's -- I mean, it was like  
18 in the middle between -- well, I'll make it 1.25. That's  
19 fine.

15:44:33 20 MR. LANIER: Thank you, Judge.

21 THE COURT: It's not a big deal.

22 MR. HALL: I think that qualifies as  
23 persnickety.

24 MR. DELINSKY: I thought you were going to be  
15:44:42 25 lickety-split, Mark.



1 THE COURT: That's fine. All right. 1.25 and  
2 3.

3 All right. So we'll see everyone at 9:30 with --

4 MR. WEINBERGER: 9:30 or 8:30?

15:44:55 5 THE COURT: 8:30.

6 So who's -- the next witness will be, is it  
7 Dr. Alexander?

8 MR. WEINBERGER: It will be Dr. Young tomorrow  
9 morning, Your Honor.

15:45:03 10 THE COURT: Who do we have, just so the  
11 defendants know?

12 MR. WEINBERGER: Dr. Young.

13 THE COURT: Dr. Young. And then Alexander?

14 MR. WEINBERGER: Yes.

15:45:13 15 THE COURT: Got it.

16 MR. LANIER: Correct. Thanks, Judge. Have a  
17 great night.

18 - - -

19 (Proceedings adjourned at 3:45 p.m.)

15:45:24 20

21 **C E R T I F I C A T E**

22 I certify that the foregoing is a correct transcript  
23 of the record of proceedings in the above-entitled matter  
prepared from my stenotype notes.

24 /s/ Sarah E. Nageotte 5/10/2022  
SARAH E. NAGEOTTE, RDR, CRR, CRC DATE

25